OSLER LIBRARY
McGILL UNIVERSITY

THE RESTORATION
OF THIS VOLUME WAS MADE POSSIBLE
BY A FUND HONORING

BEVERLY MILLAR MUIRHEAD
MCGILL PT-OT 1954

DIANA CATHERINE MUIRHEAD

THE
OSLER LIBRARY
McGILL UNIVERSITY
MONTREAL
Acc. 13726

MS
Acc.no.239
1813 v.1

1st

Preface.

Dr Gregory to his Hearers.

My ingenious auditors I now present you with a second edition of my Conspectus of the Theory of Medicine; attentively corrected and considerably enlarged by the addition of many things particularly in that part which treats of the cure of diseases.

After the experience of many years spent both in teaching and learning the science; I have often thought how highly useful a Conspectus of the Lectures delivered in this University would be both to the Professor and Students. From this idea, ever since I received the honourable station of Lecturer here, I determined in my own mind to publish such a Conspectus, and pledged myself to my auditors that I would take an early

opportunity

13726

opportunity of presenting such a work to them. I likewise thought this the more requisite because the arrangement adopted in my Department was somewhat different from that which my predecessors had followed.

The Theory of Medicine consists of three parts which are usually treated seperately, these are Physiology, Pathology and Therapeice or the art of healing. In teaching of these however I have always endeavoured as far as possible to combine the two first of them, because in many places they cannot be easily separated and in others the connection is so close that they are utterly inseparable. Hence I was afraid least an order so new, and not obtained in any printed publication, although perfectly simple and natural, might at first sight appear perplexing and obscure to beginners.

Induced by these reasons and thinking myself bound by

by my promise, in the course of two years I pub-
lished a small work as the first part of this en-
terprise, comprehending Physiology and Pathology;
but from its being made in a hurry, it was neither
so comprehensive nor correct as I could wish.
And since I was ill calculated for such an em-
ployment as the time itself was short and I was
unavoidably engaged in other very important
concerns. But sometime after (encouraged by the
flattering reception which that work met with from
my candid and benevolent readers notwithstand-
ing its numerous faults) when I could find le-
sure I attempted to correct it with as much care
as possible. Such things as were wanting it
corrected, and such as were deficient supplied
and improved, and the whole was arranged in
a better order and more compact form. But
finding with the necessary additions that my
book was swelled so as to be too large for one
volume

volume.
I therefore had it decided into two which are of such a size as not to be inconvenient to readers. The first volume of this work is Physiology and Pathology and by far the greatest part of the work; and if they had been both contained in one volume it would have made it very unequal. To avoid this I have put three chapters of this part into the second volume viz that upon generation, nutrition and the increase and decrease of the body and likewise that upon the varieties of the constitution.

It has been a matter of astonishment to many that I have preferred writing in the Latin language; and that I have not attended it in this second edition of the book particularly as it is contrary to the custom of most British authors in the present days, and I myself like the other professors in the College of Edinburgh always deliver my lectures in the English language. I was

also

ause dissuaded from doing it by the serious ad-
vice of many well wishers; and that of my book-
seller an honest man and well skilled in Litera-
ture who told me it would hurt the sale of the
book to have it written in Latin as there were
few readers or buyers of such publications in
the science of Medicine, in this country.
I could not enter into a controversy upon this
subject with so eminent a person, but I was
sufficiently convinced that any one would attempt
the study of medicine who was so little acquainted
with the nature or the precepts and the style
of the Latin publications. I say that the La-
tin language is now little known I say not be-
cause what it was to the ancients; and that it
is difficult to understand many of those writers
that are wrote in barbarous latin, for they are
so full and intricate in the style, and so full
of hard long barbarous words, that it fatigues
the

reader

Lucan Scaliger himself was to rise from the dead
he would find difficulty in explaining them.
After the lapse of so many barbarous ages it
would be vain for any one to attempt to emulate
the elegance of a Cicero or other ancient historian
in their language, especially when writing upon
any scientific subject as that of medicine: for every
science and art has its own peculiar terms in
which its phrases must be expressed very differ-
ent from that elegance of style which characterizes
other subjects. But although any one may be
less eloquent upon whatever subject he is writing he ought to express
himself intelligibly in plain and simple language
and he should not attempt any farther, for it is
not in the power of any one of the present day to
attain to the same elegance as the ancient writers did.
The first and principle beauty of every language
is certainly simplicity and perspicuity for in case
a man is to express his sense and communi-
cate it better. Hence a writer ought to adopt the
purest

purest style and used as far as possible all those words and barbarous words which are peculiar to every science or art. But it is plain that without these words the whole subject would become unintelligible; or what is more frequently happens, it may be thought intelligible both by the writer and reader when in fact it is not expressed in such a way that they can understand it; or lastly the sense of the author may be misunderstood and quite a different one given by his readers. Further were the language used by the antient medical writers, and even by them it is supposed be understood the thing when he had barely learned the words and making thought they had made some new discovery when they had only given a new name to a thing known long before. But medical men and particularly medical students ought to be aware of multiplying words for themselves in this manner, least they come at last to use the

to be the substance for the shadow?

It is certainly to attend to this simplicity and perspicuity which I am recommending when we use the mother tongue than in writing in any other language; and of course it would have been much easier for me to have done so; besides the English language would have been more agreeable both to my readers and readers. Hence it becomes a duty incumbent upon me to make my reasons for giving the preference to this language which has been so little used by our divines both especially of this country for doing this both. In the first place because I proposed it because although this beautiful and delightful language has been much neglected, and this is the more to be regretted because it was the language used by the learned and must generally understood throughout the whole world at the time when all arts & literature in Europe began to be revived in Europe after having been

revived

2

neglected for near three hundred years, and hence it was in this language that all the inventions and observations of the learned could be first imparted through all those nations in which the sciences were cultivated. It has never appeared to me difficult, nor could it readily be seen that our studies were thereby rendered easier by having all our publications xxxxxx xxxxxxxx xx xxxx xxxxxx science in a certain and universal language according to the custom that has lately prevailed; nor is it probable that this, that it has not yet succeeded, our scientific knowledge, as that it ever will do so.

On the contrary by neglecting the Latin language all the discoveries in every science are propagated more slowly; and no in a manner confined to those countries where they originally were made; hence many celebrated authors particularly the ancients are most undeservedly neglected and become totally lost, or are only discovered in the Libraries

Hop

Hope of it. — but studied although they must also
be fate. & it is for the time may come when the Greek
men may make the same observation upon us.
... publication with any thing of the word when
the authorities used D. & of the Greek in barbar
usages & when they said "it is greek to
me neither be read nor understand." when Lite
rature flourished in former ages as did also
science and police arts, and among others
that highly important art of medicine. when
these were neglected and corrupted the
sciences shared the same fate, and they de-
cayed and utterly ceased in the human race
... nearly twelve ages. Immediately however
upon their restoration & their former honour
the sciences & the same time revived. but we
have every reason to fear the return of these dark
ages again, and perhaps the time is not far
distant; for when we neglect the study of
letters

letters we distinguish that flame which first gave us light; and having once guided us through so dark and intricate a path cannot itself but be again plunged into the same obscurity as before.

Therefore though it would be a task neither useless for you nor foreign to any business of mine to inculcate this study both by precept and example as far as lay in my power. You would I wish I be thought arrogant either in what we acted because I have presumed to adopt a practice different from this college and of those illustrious men who belong to it; it would be sufficient for me if I could justify this measure by my own authority and example and every thing else connected with it is but a secondary consideration. Above years hence when the rules were established for the medical profession in this university the Professors determined

determined to deliver their Lectures in the two
the usages & practice which was sanctioned by
the authority of the College; but that the Latin
language might not fall into disuse, & that
I might express to the science of medicine with
all being duly qualified for such a task, it
was determined that all the examinations &
theses of ~~the~~ candidates for medi-
cal degrees should be written in Latin. And
it was from the same motives that my illus-
trious predecessor whose steps I shall always
be desirous to follow in the theory of medicine
& to his excellent methodical Nosology in
this language; and it was the first which
to elegance and order what had been before
strictness & rude and undigested mass of con-
fusion. With such an example before
me and sanctioned by the laws of the College
I cannot think that I have erred in writing

these

that treatise in better; to be those that may believe will be a waste of time, because my book is not open to the perusal of persons and children and generally such people as are not acquainted with anything of the kind; for it is perfectly open to all who wish well to the liberal art and who might always take a pleasure in letters before they attempt the study of any science. Thus far with regard to the form in which this work is offered to the public, with regard to the matter I contain I have long ago expressed my opinion, and now do it a second time most freely. This Compendium of the Theory of Medicine was never written for the sake of wealth but for a useful purpose; and it is only adapted for those who are prosecuting their studies in this University; for I could never suppose myself able to give instruction to such as have had long experience and knowledge in their science: and these that work is on account of those for whom it is designed only contains the first principles of the art. I shall not expect therefore to be blamed because

cause I have not introduced any of the new opinions into this work. To those entering upon a new study every part of it is new & hence and in my opinion it is the duty of a Professor to explain with as much perspicuity and brevity as possible what he considers to be the science he teaches whether it be [illegible]. Hence it is the duty of every one teaching the theoretical part of Medicine not only to explain the principles and elementary part of that science & its relations but also to describe their use and application in practice. Should I consider myself as very unworthy of my office if I were to carry with the pursuit of new discoveries & theories any time in inculcating new opinions whether they were true or false: because such a practice would involve me in all those controversies in which new opinions are attended, and oblige me either to neglect or overlook things of greater importance and which deserved more attention.

Now as I think that a full and complete explanation of all the things which are taught in the lectures of this college required to be given at length in a work of this kind; because these are better and more fully illustrated by the Professor during his lectures; hence it is sufficient to give a general view of the subjects treated in these: and briefly to mention their principles so that it may be serviceable to the students afterwards, in recalling these things to their memories. But we may observe that a perfect and complete knowledge of any science can never be given even in these lectures. For it is impossible for a man to learn any science as medicine and all the arts belonging to it without a proper degree of study and attention and therefore it requires a great deal of labour and diligence. The Professor can do nothing but open to the eyes of his students these most fertile regions, and show them the ways by which they can be conducted through

through them; while at the same time he avoids
them & the dangers that surround them as well
as they; and the traveller who understands his jour-
ney through these regions under his direction
will never miss his road. It is certainly in the
power of every man to choose his own pur-
suit and follow his own bent; & that he may
explore the regions of science in proportion to
the talents he may have for any di-
vision of them is his diligence so much the more
agreeable will be his progress. Thus every
one must acquire merit by his own labours but
to create the difficulty the more permanent
& fame will be.

There are many things which must be com-
prehended in the Theory of Medicine that I have
not taken notice of either in this publication
or in my lectures; because since their practi-
cal importance was settled to each of [illegible]

in this

in this University these things come more
properly to be taught by others.

His for this reason I have carefully avoided any
thing upon Anatomy; considering it as foreign
to my subject and likewise knowing that others
might be more able to do it. And for the
same cause I have omitted any parts of Pathology;
as all those defects which proceed from a
destruction of the structure of the part (called diseases
of the continent solids, or diseases of the
instrumental solids by Gaubius) which can be
cured in surgery not by medicine and are taught
in their proper place along with Anatomy &c.
In a word I have passed by those parts of
therapeice as those medicines and plans of cure
which belong strictly to the surgical part and
not to medicine. But as diseases arise, either
from the structure and use of the particular
parts considered as parts of any machine or
system or from the functions of the living body
and

and the diseases which impede these functions with an account of the principles and general remedies, and their powers and effects in healing such disorders.

According to the opinion of some I ought to have passed over that part called Physiology altogether but in this I could not coincide with them although I have touched upon it as slightly as possible, believing the best part of the instructions on the functions of the human mind and its connection with the body, because all that can be said upon this is only conjecture, for we have nothing else to rely upon it. But even among these conjectures it is highly proper to take such of them as appear the most probable and ingenious although we in the present day have never yet been applied to the science of Medicine

I am unwilling to believe that nature has denied the human genius so far that the ancients

to these regions will never never be discovered
But those such as have already tried this study
have commenced it under a bad omen, & taken
a wrong road, so that the time is still to come
in which the subject will be investigated. My
opinion is therefore at present that the Abbe
this subject as it is still unimagined. There
I commit myself and my theories to the mercy
of the world, till such time as the Earth shall
with more exactness to the sun and more
judicious observers than myself shall arise
to celebrity for their genius learning and indus-
try and who make great progress in their science
than all the other authors of this age. After the
most elaborate calculations I have been
seriously to show that two hundred and three
million, four hundred and fifty three thousand
& three & thirty, may be imagined with
safety as a medium of the probable distance

of the brain which does not weigh a single grain
& that have been their authors chiefly
who have tried with great subtilty & pains
in what part of the brain the mind or soul
is situated: from all which it is plain & evident
that there is a great deal more necessary to be known
in this branch of science before it can be so modified
as to be of any use to us.

Although I am well persuaded that all the actions
of the living animal depend upon the connection
that subsists between the mind and body; and am
also certain that these can never be completely
explained till this wonderful connection be
clearly understood; yet I should never venture to
undertake a task of so great difficulty; nor at-
tempt to explain a subject involved in so much
obscurity and concerning which there have
been so many different opinions. In this part
of the work I shall therefore be contented myself with
barely

merely relating such things as have been ascertained by experiment and accurate observation. But as for the general laws of these things and the manner in which the two are reciprocally affected during their action I must confess myself totally ignorant, nor do I find that is known to any one. It perhaps may be sufficient for the Physician to know that there exists an intimate connection subsists between the mind and body, that they affect each other reciprocally in a very sensible manner; and that in curing diseases we must not only attend to the corporeal affections, but we must also, it is necessary to attend also to the mind, because the best and surest guide we can proceed upon.

But although we have adopted the internal system with regard to these and other parts of the subject which are not well explained we shall not, however, yet it is to be feared that many

[illegible] will
have their doubts concerning any thing that is
offered to the world under the title of a theory
in Science; for this is a thing they have been in the
habit of doing.

It must be confessed that many writers upon the
theory & practice have abused the patience of their
readers by introducing trifling things into
their subject. And hence it is not without reason
that many Medical men as well as others have
considered a theory of this science as a vain
and foolish attempt; and that instead of doing
good it is often prejudicial to beginners because it
draws off their minds from things of greater im-
portance which are only acquired by experience.
But we must not suppose from this that no
part of the theory of Medicine is of any conse-
quence; but even if there should be some things
found in it which are not well established or
which we cannot see we must not for this reason reject
the

the whole as useless that we find the [illegible] we are in
by any means assured have been
already surpassed by the discoveries which the
industry of Philosophers has made in their
first principles. And this was a thing foreseen
and predicted by the penetration of the celebra-
ted Lord Bacon the father and creator of Natural
Philosophy. "In the mean time" says he "we
"can expect that any great progress will be made
"in the sciences particularly in the practical part
"of them) unless Natural Philosophy enriches the
"particular arts and these arts be again applied
"to Natural Philosophy. So that we need not wonder
"that our knowledge does not increase when it
"is separated from its roots" Nov. Org. Lib. I. Aph. 63. It is
obvious that the theory of [illegible] ought not to be
filled with vain and useless conjectures and spe-
culations but [illegible] contain only general truths
established by actual observations, from which single

truths

whether are derived, and to which all the discoveries which are made are referable. No one will say that a knowledge of their descriptions such as we have of arts and sciences are either certain or useful. Now it is to be wished we had such a theory of the science of medicine, which is the more desirable because it differs so widely from the others of the practical kind. For in these there are certain rules and observances fixed by which the operator conducts his work; and by which he can foresee the events that he undertakes; although he can make such alterations in his subject as he pleases; and often completes his undertaking when he knows very little of the principles upon which his art depends. But in medicine a man can form a real plan and judge of his own, or the Druggist prepare a medicine according to the principles, and neither of these will foresee any thing in their materials that will impede their work. The matter therefore is to be learned and

already

4th
always the same; and at all times under the same
management. They are also perfectly acquainted with
its nature, and can change its power and quality
as and they please. Hence in all these cases the
mechanic is able to make the requisite
addition and change which the matter is called
called for.

But in the science of Medicine there is a very
wide difference for it is involved in innumerable
difficulties. The matter and machine upon which
we operate is of the most delicate structure and
so changeable that it not only varies in different
men but also in the same man at different times
and is likewise liable to be differently affected by the
same substances; so that what at one time and in
one person will be serviceable, at another period and
in a different person will be hurtful; or perhaps
a substance which at one time will have very little
or no effect upon the human body will at
another produce a very powerful effect. So that in
changes

endanger life. That the chief difficulty in the art consists in discovering what changes are necessary to be made for removing diseases, or what is necessary to be done; and likewise in detecting the morbid condition and the means by which it can be remedied. Hence it [illegible] the duty of a Physician to be acquainted with the different remedies which are usually of service in certain disorders that he might also understand the nature and causes of diseases, and the [illegible] made of administering these remedies with their manner of acting. By which means he will be able not only to direct the plan of cure proper for each case but can also vary it as [illegible], or adopt a new one altogether. And the morbid affections to which the human body is liable are so numerous and their remedies so very different that no man possesses a mind so capacious or a memory so retentive that he could remember them in time [illegible] you may

Hence

Hence a Theory of Medicine in an imperfect
tion of its general principles is attended
with the greatest difficulties and intricacies or
contrariety; and to direct us to that method of cure
which is best calculated and most safe for the na-
ture of the disease and circumstances of the patient
and the most likely to procure relief. Hence the
evil: the want of accuracy in the medical art and
the more feeble and imperfect the theories hitherto
adopted have been; the more diligent we ought
to be to invent a more perfect one; because with-
out this the science cannot be reduced to order
nor can it ever be of the same service to mankind
as it would otherwise be.

Most of the writers upon the Theory of Medicine have
erred in representing this part of the science as near
ly perfect, and as not only capable of explaining all
the functions of the healthy body but also able to
account for the causes of all its diseases and to
point the method of cure proper for each of them.

But

but it is obvious to any one, both from the theories which these authors have carefully invented, and also to all who have practised the science as dependent upon these principles how much the medical writers have been deceived in these particulars; for each of these theorists whenever they found any difficulty or deficiency in the science immediately filled it up with some conjectures of their own imagination; by which means they framed a science as they were easily themselves led. And from this it happened that many authors of celebrity trifled away their time in learning theories which were only satisfactory to their professors, or in inventing reasons which were not much better. And from hence arose controversies sometimes about things of importance, but more frequently about things of a trifling nature which rendered the minds of Physicians and deterred them from attending to more serious matters

which de-

which deserved justice since there every age produced new theories of medicine; and while we have reason to laugh at the opinions of the last perhaps in the next our own may appear as ridiculous in their turn.

"But (does the writer of Cleone) we ought not to doubt these theories in which there is no truth, but rather those in which the whole truth is wheat." Be it so: although it may be so intimately interwoven with many particles that scarcely any part of it can be clearly discovered that it can be judged of or understood with certainty." If it however be granted that medical authors have differed so much about the various theories they have adopted or some of them have argued, though not with the greatest honesty in support of the opinions they had (whether they were right or wrong: thereby forgetting their oaths to judge without partiality, and merely to do

may

dispray their opinion, learning and eloquence in defence of the cause they had undertaken. In this [illegible] they [illegible] they carried [illegible] whatever [illegible] side of the question and invented what appeared necessary to it: so that in their discourses they advanced many false and subtile arguments about things which were but imperfectly known: and they wrested such things as were positively [illegible] till they changed their meaning to make them agree with their own erroneous opinions. For as there is nothing, nothing can be so different from, or contrary to the dignity of true wisdom as false opinions about things well known; so do they detract from the excellency of such things as are not sufficiently understood."

[illegible] there have been many reasons given of [illegible] being initiated in various ways and at various

various persons upon this subject, and so far does therefore the case that there has not been one age in which some of the most serious of these errors have not had their influence [illegible] of the science of medicine.

People always have remembered that the person be ill with regard to medicines matters has been discovered, and that the science and medicines others has been liable to be corrupted by those serious errors that have crept into its fundamental principles.

With regard to the origin of medicine all authors are perfectly united because it is one which has at all times prevailed, and so far it differs from the other arts and sciences which minister to human necessities, and tend to alleviate the troubles of men, for it has at no period been alienable; for while the state of man here has rendered him subject to diseases medicine has always been practised

practised to render them more easily learnt. It is obvious that in all ages man has expended his ingenuity and industry to acquire pleasure and to obtain those primitive articles he was subject to in every country and at different times therefore has had many occurrences to direct his pursuits in this respect; which they have in some cases they have been successful and in others quite the reverse. From all this therefore we cannot doubt that this science may have its origin from every inhabited part of the world even where man lived in a rude and savage state; hence will calculated such men were to investigating the causes and origin of diseases.

Mankind have at all times been compelled to take notice of Diseases; hence it is such have always been considered as having an undeniable claim to the attention

5th

of their friends. Their duty was to be present and to instruct which has been hitherto neglected to investigate the causes, origin and nature of diseases, although at present they do not in a very able & methodical way. For common sense teaches us that there can be no innovation or change in the nature of things, without there being some cause for it either concealed or manifest, although it often requires a sound and perfect knowledge and a certain calculation of circumstances & their causes.

That Medical authors have [illegible] taught that diseases were not regularly & methodically treated and investigated as they ought to be, nor even explained by sufficient consistency & observation made by them & such discrepancies; but the cause in this case was [illegible]

have

they suppose
lectures men to be led out by a new
new doctrine or scientific pursuits, under the
pleasure had not in their power to introduce any
other principles or to alter the institutions of Nature:
nor therefore they concluded that such pursuits
ought solely by the dictates of common sense
and that by following their plain & obvious
directions solely and directly the best
simple parts they have arrived to their present
but instead of this being the case mankind
experience that many have not
been entirely regardless of such obvious facts
by frequently paid little attention to things
which fell within the cognizance of their senses
and when ever they attempted to account for
them they did it from principles that were
false and absurd and many ever such as
their own wild imaginations suggested to them
besides in such men we often find a wild and

unexplicable

inexplicable credulity and a wonderful desire for the marvelous which is returned with the more avidity in proportion as the objects of it deviate from common sense or what they have usually seen. Hence from the earliest ages the physical causes and causes of diseases ascribed to the influence of evil spirits, the wrath of the gods or the malignity of unlucky planets, or the power of sorcerers and magicians, or causes proceeding from hence. And from this idea they endeavoured that the only means of cure was to pacify the gods or demons and remove the unhappy planet or frustrate the attempts of the magicians; which they did by performing various superstitious acts of piety such as they deemed proper; and on the other hand that when once the cause of the disease was removed by this account the disease would soon cease of itself. Hence among all the uncivilized nations

as fine the medical profession practised by the Priests as they were called with religion & magic, under in some cases where it is joined by a race of women who [illegible] & the Medicaments are received with [illegible] thing more than human, such as they say there are cunning people in some places who [illegible] upon the ignorance and credulity of others [illegible] pour out their virtues and [illegible] are ambitious to shew the efficacy of a remedy [illegible] advantage to their [illegible] thereby sacrificing the dignity of the art & the interest of the artist. Thus all the professors account women that the science of medicine made so little progress among the unlearned for so many ages: and even in the time of Hippocrates, it was confined only to the priests and asclepiades, it was confined only to

and

and [illegible] were the cure to be sought, or whether it were better that it were the interest of the Physicians to conceal every part of the Science from them that they might exercise it with that more authority when they have been in the dark
And we must not wonder at the corruptions that have crept into the science of medicine & the ignorance and carelessness of the Physicians, some of whom have been in the dark & upon who the [illegible] the cause of Philosophers and pretending to search into it indeed to [illegible] Before the art of these people but indeed of doing ill they may have increased it in many particulars real and [illegible] were sufficient & [illegible] because they [illegible] founded upon the mysteries and of the science and exasperated by the envious and probable arguments. Men have also been

been among many opinions both in ancient and
late times concerning medicine, founded upon
the like philosophy and reasoning by which
probation of some celebrated authors although
imaginary and
absurd in the present
time stained reputation and authority
and become perfectly true and
established that for many years the
contradictory known opinions in medicine that the
origin from any visible foundation, or from
the nature of the disease and the right
cure of it but from the different
fancies of the physicians
as Egypt in the most ancient nations of India
others seem to be the customs of the
ancients and temperature and also the human
body or numbers as the pythagoreans did in
all which numbers which has prevailed
more as the true medical art for near two
thousand

thousand years and is not yet altogether established in some places.

But the most serious and permanent evils to which science has been subjected have had their origin from medical men themselves; whose earnest they had cultivated the art & certain extent began to philosophize upon it and thought they could form a regular and extensive science upon the observations and doctrines they had adopted. But in doing this they fell into many and blunders. They did not distinguish between the facts they had learned from experience and observation and the opinions and conjectures they had formed upon them. As their whatever opinion any man formed for himself he immediately adopted it and taught it to others. But as soon as this method of studying the art of medicine had ceased, as we find from the annals of the science. They adopted the inaccurate practice of studying it from books written upon the subject. Hence the numbers of men who were

formed

handed down to us at the present day; and the hands of them we consult, and often peruse with the utmost attention; without having any Idea of distinguishing between the real opinions which their authors have formed for themselves; and the sophistical cavils & glosses which prejudice may have made upon them; although such a distinction is of the utmost importance to the Right understanding of

Much part of the writings of the Fathers which we have come down to our times, appear to have been corrupted by the impious audacity of their immediate successors and scholars; and we cannot be sufficiently upon these our guard. Almost the whole of the publications for many ages after Christ are filled with numbers of the vain and futile philosophical opinions of those times. And we may also observe how ill the labours of a Calvin are coupled with the Herculean opinions; and the Hyperoxalic

Doctrine

1st It is upon this principle that the greater number of our Quack Medicines have been invented and so highly recommended; and wherever we find a newspaper or hand bill extolling the virtues and efficacy of any secret remedy we may ascribe it to interested motives in the inventor.

6th
doctrine which might be supported upon its
own foundations, or upon new and accurate observations, being perfected by the skill of those great
artists of Aristotle. And what can we say for the
commentators of the Arabs if they deserve such
a name; which they have added to the works of
the Greek Physicians, or rather changed these into
commentaries. And what of the age of the
empirists who flourished a short time after
Jesus Christ; or of the theories of the chemico-
mechanicists which appeared in the age succeeding that. And what can we say of the
opinions of the Methodists and their supporters
or those of the Italian. And lastly what
can we think of the Astro-mathematicians
and their false demonstrations upon medical
subjects, by which they thought they had mo-
dified the whole art to themselves and
successors forever. Or what can be said of the
more celebrated Astro-mathematicians of our
own

own days who thinking they had overcome their
own enemies and those of all mankind in a fair
warfare, excited triumphantly. "It cannot be
"denied that we have solved this notable pro-
"blem; which is upon a disease being given to
"find a remedy; and this we have now done."

Medical men have as yet established few things
with certainty; and as far as can be judged there
will be few established for the future than
among us particular, until they are discovered
from experience alone. From this we can readi-
ly learn many things but the most skilful use
of Physicians and cannot lead greatly to the
advancement of the science because they
must be ignorant of the cause and explica-
tion of such medical discoveries. Therefore
surpasses but as Bacon observes "the
application of any experiment is worthy
"further than concerning it in an ingenious

way to

"they to another more experiment." And however
for reasoning it necessary in abstract subjects
it ought to be applied with the utmost caution
and diligently observing how the facts ad-
mitted and the opinions of other authors agree
them: so that if at any future period these
opinions should be found false; the experi-
ment or fact may remain and be applied to
practice by some more sagacious and fa-
mous Physicians.

Nor can it be said that mutual authors have
erred in their opinions alone; they have often
been deceived in those facts which they deem
to be by observation and thought properly
established; because some having seen the
same thing happen two or three times they
believed it to be certain and constant and
therefore adapted it as an axiom and
principle. And from this circumstance

&c.

they have recorded discoveries of many things & then
positively assert which can by no means be,
and are strangers to met with. That there are
such a number of secret & hidden conditions
& causes which the human body is liable, and
these may be effected in so many different
ways by external occasions, that it requires
the utmost prudence and circumspection
to assert & affect with any proper reason;
so that we must be content not to attribute
that to the disease which proceeds perhaps
from the strength and operation of the rem-
edies; the efforts of nature, or the agency
of external causes which cannot be easily
by discovered. And for the same reason we
ought to be very cautious in putting too much
confidence in the histories of diseases com-
piled by the ancients; and the wonderful
accounts they have given of the powers and
qualities

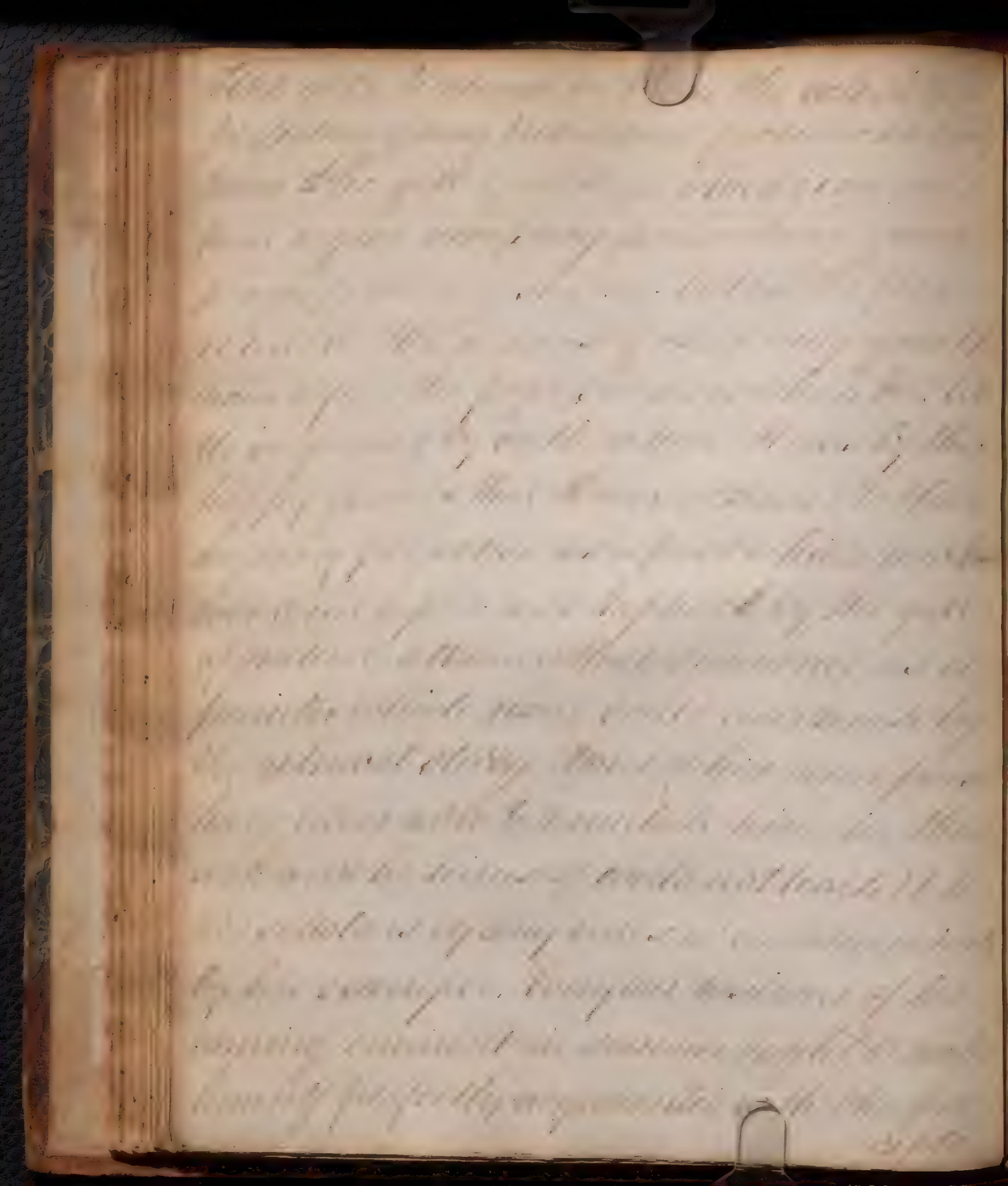
particular remedies although they may in part
& blame the Physicians for neglecting their natural
power & their efficacy they have not sufficient
convincing proof. For there necessarily must
exist great differences between the
two sexes both of the learned and ignorant
who have given their judgment; for many
of them who were neither partakers of these
secrets nor have reaped any benefit from them
have necessarily been ignorant of their efficacy
if it has been acquired; & while they give
their testimony to them they have not
had seen a thing they were acquainted with.
From this circumstance it has usually not
only to repeat these experiments upon which
we wish to form any observation as often
as possible; but we should have them
tried in various different ways since

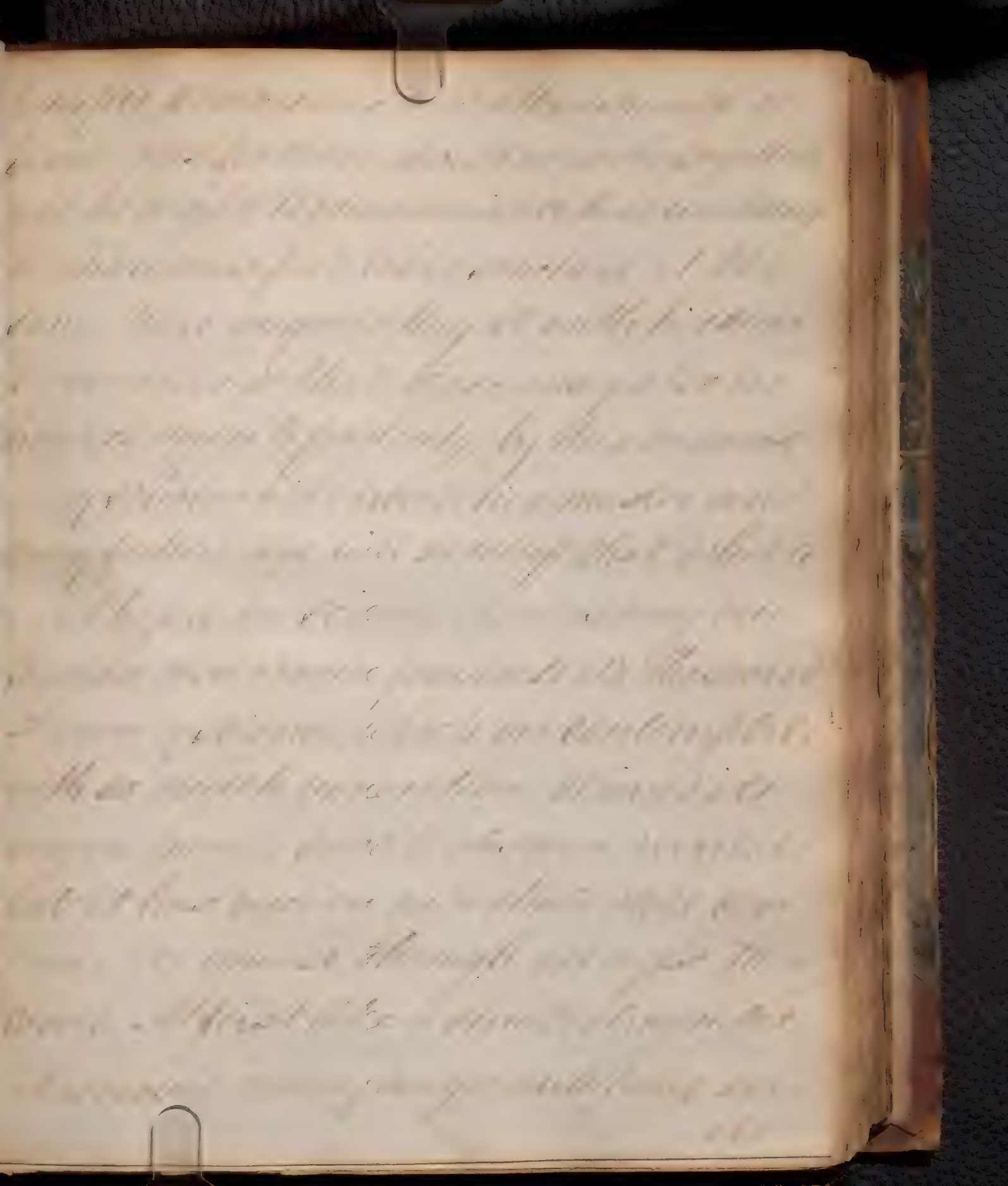
can

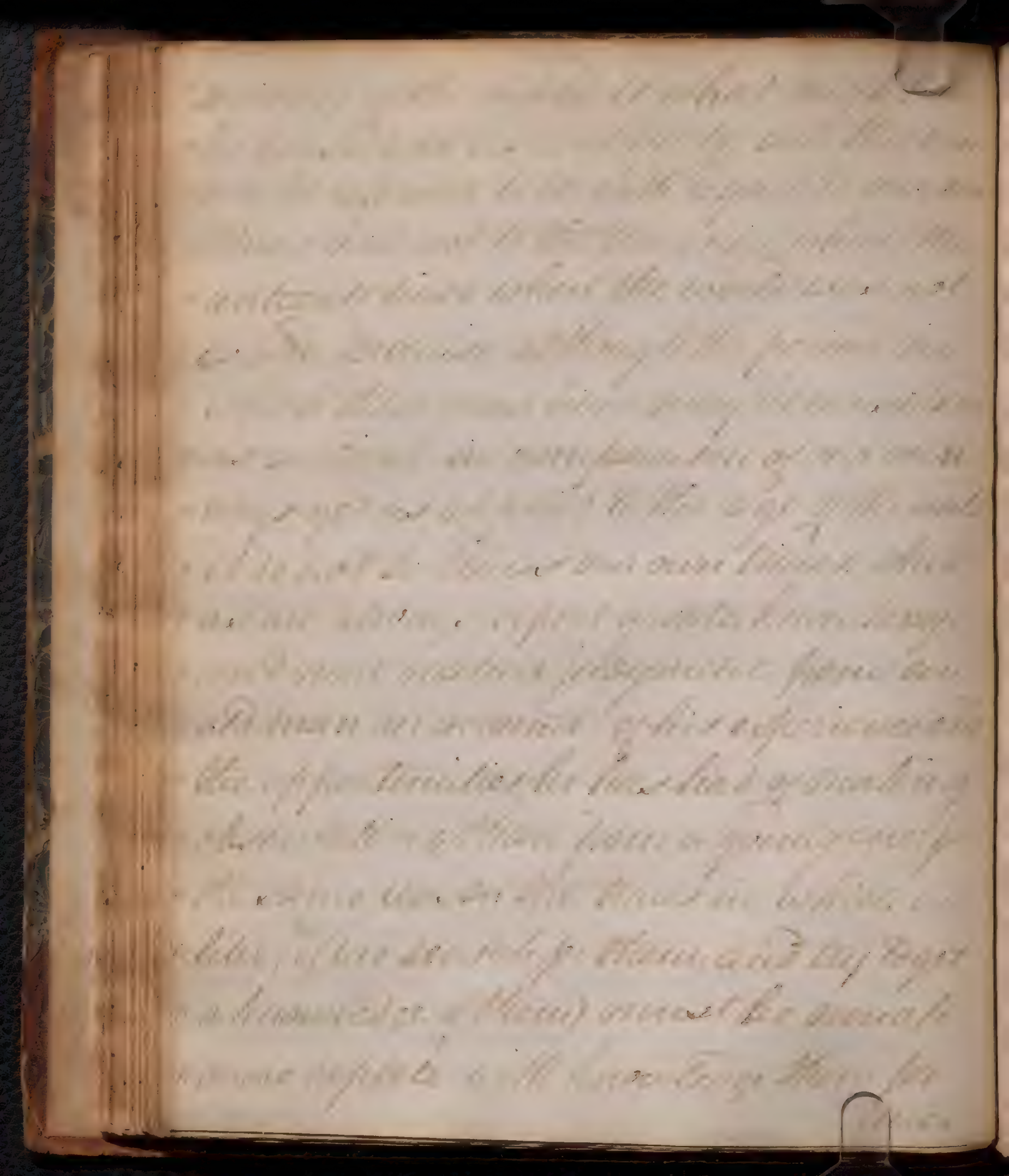
can, both upon different bodies and upon the same body at different times, while it is in different states and under the influence of different external causes. So that [illegible] may be allowed. The expression of modern men ought not even to be trusted here as because they are only capable of delivering part of the subject upon which the heart and not the whole of it.

[illegible]

Hippocrates was a native of the island of Cos in the Egean sea, - a scholar of Democrates. Flourished in the time of Artaxerxes and died at 104 years of age.







X

X Dr Aiken in his admirable Essay on Analogy" has the following admirable remarks.

"Medical Theories have been little more than a succession of false and overstrained analogies. At one time chemical ideas gave the reason, and then every operation in the animal body, sound or diseased, was ascribed to ferments neutralizations, volatilizations, condensations, and other processes carried on in the Laboratory. Afterwards, mathematical and mechanical principles took the lead, and the size and weight of particles, their free motion or obstruction, the density or rarity, viscidity or tenuity of fluids, the impelling and resisting powers, the contractility & elasticity of fibres and the like, were applied to explain the whole animal economy. In latter times the living principle was taken into account, and the human body became a self moved machine Electrical, subject to excitement, exhaustion, overcharge, inertness &c. Thus each set of theorists have had a favorite analogy, to which they have accomodated their language and reasonings, often to the total disregard of other considerations."

Every thing calculated to remove or cure diseases may also produce them; for whatever has a tendency to accomplish useful changes in the body, may, under different or opposite circumstances, be attended with the contrary effect. Hence no medicine whatever ought to be used as daily food — a favourite practice among inferior valetudinarians, and the votaries of quack medicines. — Bilfinger, Dil. 662.

Syllabus of Lectures on the Theory

of

Medicine

I. The functions of the living body — of the nature and causes of diseases — of the powers of the body which resist them, and of the principles of their treatment — of the use of diseases and of the powers of medicines.

1 In the human body is a constitutional power of resisting destruction — it is exerted in many modes — the principles of the most important of these modes are to be explained through the medium of natural causes — and others performed their functions without the intervention of any effort of the Body.

II Under the first, of these we may arrange all the causes and voluntary motions, which are known & the simplest are the only evidences of

our existence. All these [illegible] designated by the name of Animal functions.

III. These functions are by no means capable of exerting the same power at all times; it may [illegible] mind or of both the powers of them are exhausted. And we soon become sensible of this by our own feelings, for we are compelled to lay aside our labours and [illegible] and becoming incapable even of enjoying our pleasures, must at last resign ourselves (however early and unwelcome) to sleep. And after being revived and refreshed by it we arise with new vigour and alacrity and be prepared for the discharge of all our usual duties.

IV In the second class of functions I have comprehended all those by which the body nourished also those by which it is protected when it is attacked. These are divided into vitals and [illegible]

V The first or vital are those which are absolutely essential to life that without them or any substance it cannot be maintained but any moment among which we may count the action of the brain & nervous energy, the circulation of the blood and respiration.

VI Any living machine formed without these must quickly decay and perish. The solid parts are wasted by every movement and the fluids from perspiration leave the Body weak and emaciated; besides both solids and fluids are naturally subject to decay from their becoming putrescent: and thus every living thing may be said to have within itself the seeds of its own dissolution.

VII [illegible] beautiful creature man is not left in this wretched state. For He has not only provided a remedy against those evils which threaten us on every hand, and which if unprovided against would soon reduce us to dust by an admirable contrivance the

He has so planned it that [illegible] reduces
vigour and health to us.

VIII The juices being partly wasted by motion
exercise, eat and drink to nourish them.
and these being taken in and digested are
diffused through the whole body to supply
this waste, and what is superfluous is
thrown off. By this motion the solid parts
are subdivided being worn somewhat as
becomes an readily pressed thereto. And
it is by this exercise that the various fluids
so different in their nature and designed
for so different purposes are made from
the general mass.

IX That part of which we termed the natural
functions, though necessary to life and health
as well as the former may be suspended for
a little time without life being endangered
as among these are reckoned Respiration Secretion
and Excretion.

X Thus we see that by the bitrice and Pulmonic functions a man lives grows, is refreshed and nourished: and thus becomes fit for exercising the animal functions. The operation of the whole is further that it earth is seen only to be comprehended by Almighty wisdom! to do how even it exceed all the efforts of the most capacious human mind, that after innumerable trials neither the origin or termination of the cause by which these functions are performed here ever in part been discovered.

XI There is no machine but a living creature that possesses the power of motion in itself and none else is possessed of a locomotive quality by which it can either avoid danger or accomplish its ends.

XII At first view it would appear that a machine possessing these qualities would endure for ever unless destroyed by some external cause: and it is only from experience that we learn it is not the case. What we

daily see Humans very healthy and robust as an animal may be, yet we find in the course of time he will fall off, become old and die: that he returns to his original dust and becomes the nourishment of other animals which follow him.

XIII. This as a provision against this that the Laws of Nature have been established: and while men are daily dying: by these the human race still continues to exist. Hence the alliance of sexes, hence generation and all the pains and pleasures attendant upon the sacrifices of Venus are daily endured.

XIV The whole inhabitants of the Earth were at first created tender, feeble and destitute of every requisite for the situation in which they were placed: for a long time they were preserved and nourished by their parents: till by degrees they grew up to youth and from youth to manhood; till at last they became equal to their fathers both in Body and Mind and did

course of time they become constant species in the same occupations, and at last yield to the common lot of all and die.

XV The whole of animated nature is subject to these examinations but there are others which more peculiarly belong to man alone. In man however there are some differences which exist among animals. And these differences not only exist in the complexion and formation of the body, which deserves but little attention, but they are discernible in the mind and are known by the name of temperaments in Greek called κατ' ἐξοχήν and are particularly deserving the attention of Medical Men.

XVI These variations of mind which are also conspicuous in the body are not only known with us but are observed to be hereditary in families and thus we find the same in their offspring, both in a diseased state of body and mind. In that nothing

and their external likeness to them — but also their dispositions and passions whether virtuous or vicious. In this manner we find the Claudian family at Rome long distinguished for their misbehaviour cruelty and wicked passions conspicuous in their successors as Tiberius, Caligula, Nero, &c. and has been Nero for the space of two years.

XVII But it is of importance to the Physician to know how the human body undergoes many changes from other causes besides the above. Thus it is affected by the way of life, the kind of food we use, and likewise by the climate and force of habit the most powerful of all others.

XVIII It is not easy to give a detail in words of that particular state of the body which may be called perfect health, and perhaps it is still more difficult to describe the symptoms which more particularly

particularly belong to the mind in that state.
This difficulty arises in a great measure from
the infinit variety which Nature from the wisest
designs has introduced among men; a variety
so disposed that many people enjoy perfect health under circumstances which would
be very hurtful to others. It may however be of service to the Physician particularly to describe the state
of a man enjoying perfect health in the [illegible] of his
way. He is not a rational [illegible] the least gift of his
understanding sound and vigorous; he is not only capable of discharging the usual occupations of life,
but he can readily call forth his mind and bear any
[illegible] to which he has not been
accustomed. His judgement is not only clear
and [illegible] but he is able to acquire and
retain whatever is necessary. His mind is
firm and serene whether of a cheerful or gloomy
cast, and he is always so much master of
himself that he is never perplexed or overcome
by any uncommon occurrance. His passions

and

and glories are sufficient to him and he is not a slave to them. He is capable of enjoying good fortune with moderation and although he may be affected by adversity he is never overcome by it. These are the indications of a sound mind and they also go to indicate a sound state of the Body; for which thing contribute in no small degree, as while mind and body are so intimately connected they cannot fail to influence each other in no small degree.

XIX. The following properties which belong more intimately to the Body are marked as proofs constituting a healthy state of it: A strong sound Body is of a proper size and well formed, being neither too long nor too short; too lean nor over burdened with fat: that is well proportioned and not too much emaciated. The chest ought to be large and full: the shoulders broad and bones large: with well marked fleshy muscles, strong and apt to tremble. The skin should be soft and moist as a symptom of the skin always inclines a sickly habit. The colour of the

grace whether fair or brown should always be with ease and permanent as any thing of the kind — yellow hue is always attended with some constitutional affection. The countenance ought to be cheerful and the eyes bright and sparkling the teeth sound and strong. — The step firm in action showing the limbs equal to the task of supporting the body. The spirit ought to be erect and the body able to endure all kinds of exercise and not be changed beyond the usual period or too frequently repaired. — The external senses — must be all capable of discharging their offices with propriety. As it is necessary for the body to be refreshed with sleep it ought to be ready to enjoy it at the proper time; and that sleep should be sound and not readily disturbed so that if there are any dreams they must be of a pleasant tendency. Besides these there are other indications of a sound state of the body as follows. A proper degree of quickness in the circulation so

that

that the pulsation of the artery may be full and soft neither too quick nor too slow. The respiration too must be free and easy and not readily accelerated by exercise. The voice should be full and sonorous without any tendency to hoarseness. The breath perfectly free from any foetor the mouth moist and the tongue clean and clean but not too red. The apetite should be good and regular so that the patient may feel disposed to take his food at the proper time without any incitement. The thirst must be moderate and the digestive organs free and easy without any flatulency. The stools should be regular and the urine retainable for the proper time and voided without difficulty. And although its colour must vary with the aliment used the less sediment it deposits the better. The exhalations through the skin ought to be regular in quantity and constancy but not

to many

to a very great degree insensible perspiration is brought on by exercise. In the same manner the internal secretions must be of a proper standard both in quantity and quality. A man in perfect health eagerly seeks the company of the other sex and is perfectly equal to the task of the procreating his species. But in this respect women differ from all other animals owing to a periodical formation of their sexual organs. In them the regularity, both of time and quality of the menstrual discharge is a mark of health. If they are of a sound healthy constitution they ought to enjoy good health during pregnancy and undergo the effects of child bearing well. The milk too at that time should be secreted in a proper quantity.
Besides these particular features of a sound state in both sexes there are other things included in a state of health which don't happen to include diseases. When there is no impediment in the external organs people in a state of health

are capable of exercising all their functions in a proper degree. They are besides liable to be affected with diseases than others and will bear with very little inconvenience vicissitudes within the tropics and past which would kill others of a sickly constitution. Lastly we may observe that even a healthy person is not always in the same state, for the constitution is liable to great changes at some periods of life. That a man will differ as much at one time from what he is at another as one man does from another of the same age. And this is obvious whether we look to the powers of the body or mind as well as to the internal vital functions. Hence it happens that the body is nourished and increases up continues for a certain time in full vigour and then falls away and decays, without any very conspicuous alteration in its health, spe

"Incertus Ibamus, sitis quo ubique foret."

XX All these different circumstances which in fact make the body in a state of health are arranged under the title of Physiology.

XXI But notwithstanding what has been said in order to shew that man does not pass through childhood, youth, manhood, and old age, and all the different stages of life without any deviation from the laws of Nature as above detailed. On the contrary we find him liable to innumerable disorders which blight the finest frame, reduce its strength and interrupt many of the corporeal functions. Besides these often assail the body with such excruciating pains that even the mental part does not escape unhurt.

XXII. Of these disorders we find some attack us at our very birth. Others again arise upon us in the flower of our age and either snatch us away suddenly in our youthful days or lingering sickness. There are some too which are more ready to attack us in the decline of life; and those oppressing the body already by advancing by Nature either cut us off suddenly

death or make us linger out a miserable exis-
tence till death close the scene.

XXIII The Nature origin and effect of those
diseases together with their mode of acting
upon the human body is treated of in the
science of Pathology, which is divided
into general & special Pathology of which it
is only the principles of the first that can
be detailed here

XIV When a body differs in any point from the
above principles of health, then is it said to be diseased
its usual actions are either in whole or in
part interrupted or are performed with difficul-
ty it is said to be in bad health or sick. Diseases
may happen to both the solids & fluids: and as one or more of its functions
may be affected this gives rise to a distinc-
tion in Diseases called simple & compound
according as they affect one or more of the
functions.

XV We find an example of the most simple

diseases

diseases when any of the parts of the body are broken or in any way injured so that they are incapable of performing their functions, likewise in cases where all the parts are entire but where there is a morbid state of some of the solids or fluids: so that they loose those properties peculiar to them in a state of health they acquire others of a very different quality. And lastly is unhealthy when the moving powers are either too quick or too slow or in any other way unnatural.

XXVI. Diseases of this kind however are seldom met with or at least seldom become the object of our attention, because those at first of the simplest nature soon produce others with more indications and varying signs by which they come to be distinguished. The symptoms or indications of diseases may therefore be defined those unnatural circumstances which are perceivable in the sick, the chief and most conspicuous of which are what constitute the disease and distinguishes it from others. And although are set these symptoms often

often give rise to another yet the cure of them always proceeds from the cause of the Disease

XXVII Although there are an innumerable sort of symptoms observable about the sick and the knowledge of them are of the utmost importance to the Physician both to enable him to distinguish one disease from another & so to apply the proper remedies either to cure or alleviate them: Yet this innumerable number of symptoms may be reduced to three general heads as follows viz. 1st Disorders of the Functions 2 An inability to exercise the powers of Perception 3 Actions and the state of the appearance or other qualities of the body which is obvious to the senses Every disease chiefly consists in the interruption of some of the functions of the body (24) so that it cannot perform its usual actions: and none of these functions can be affected but the person soon feels particular sensations by which he discovers that he is not in health In the

the same manner a man can be in bad health for any length of time. but there is a conspicuous alteration takes place in the appearance of his body as in the colour of his face or otherwise. (19)

XXVIII. Among the principle indications of an unhealthy state Physicians chiefly observe any derangement of the animal functions (2) that is any impediment in the exercising of the senses or voluntary motion. For experience shows us that the external senses may be irritated in various ways: and may become either torpid or too acute perhaps are exercised with difficulty as they may be entirely lost. We also find the Internal senses are affected by disease and these merit the attention of Medical men in a peculiar manner; for these are not only indications of the most serious diseases, but they also are the best marks of any increase or remission of these diseases.

XXIX. It is for the same reason that equal attention in the moving powers ought to be attended to whether they fail in part which is a common occurrance in almost all diseases

diseases and constitutes what is termed Debility. For these may be deranged as in the paralysis; or naturally strong as circumstances favourable to some affections of the brain; or lastly they may be entirely deprived of action as in Convulsions, and other similar disorders.

XXX. The sleep of the patient forms another Indication which deserves attention, whether it be considered as a function of the body or as affected by other functions— as it is apt to be disturbed in most diseases any deviation from its natural state is worth notice. The patient may therefore be either deprived of it altogether or he may sleep too much; it may also be interrupted by disagreeable dreams or may not refresh the body as it does in a state of health.

XXXI. The symptoms of any derangement of the vital functions (5) are those of the greatest importance, because these not only indicate the malice of the disease and debility of the patient, but they also show his danger or

at least if they are violent. Among these we
must call the variations of the pulse which
show either a deficient increase of circulation
as in intermittent fevers or irritation
accompanied with faintings

XXVII. The next set of symptoms in importance
are all the varieties observable in the Respira-
tion whether it be too quick or too slow or if it
be performed with difficulty: or if it be accompa-
nied with cough, sneezing sighing or the like.
So that we may add the various affections of
the voice although these more properly belong
to the first set of symptoms (27)

XXVIII. Besides these we must attend to
any derangement of the natural actions (q)
as any deficient or depraved secretion of the Gastric fa-
culent or Bilious or any unnatural state of it.
likewise any defect in Mastication Deglutition
or Digestion. The state of the Bowels whether
loose or constipated. We must also attend to
the state of such of the secretions as we are
able to judge of and also to that of the Excre-
tions as the Urine or Respiration whether

they

they be in too little or too great a degree or in any other respect unnatural. Any other alteration in the sexual organs particularly in females deserves our consideration.

XXXV. Any circumstance which interrupts the exercise of the senses or renders their application unpleasant which is a common concomitant in disorders must not pass unobserved. Pain as it seems in both these cases these with facility and with certain degree of pleasure as often be in itself the interruption of them soon becomes a source of uneasiness and disquietude to them. To this head we refer all pain and anxiety, restlessness, with a sense of weight and oppression or stupor also the several kinds of heat or cold and other more disagreeable sensations, as tingling and ringing of the ears &c all of which ought to be attended to. For in many instances these occasion as much trouble to the sick that they may be considered as the chief part of the disease because they often originate

acritate and oppression even worse than death, and if neglected are ill to be cured with out danger from the latent cause they proceed.

XXXV. The third class of morbid symptoms consist of all those unnatural appearances of the body which cannot be referred to any of those classes of indications which have already been mentioned; and which are obvious to our senses the surface being pointed out either by our injuries or the complaints of the patient. By their descriptions are the various unhealthy appearances of the body chiefly the colour of the countenance whether pale, red, yellow, brown or varying; and also those indescribable appearances of the face proceeding either from a contraction of the muscles, or from the unnatural state of the circulation of which is often the case from the state of the patients mind. This is by no means to be neglected as these are not only certain indications of the condition of the sick as to his health strength, but more pretty clearly any increase or remission of

of this disorder. The same may be observed of the various appearances of the eyes: whether they appear languid or dull, red or sparkling, of an unusual ferocious appearance. They are also distorted in some disorders, or appear else unusually small; in some one or both appear shut, and in others one appears larger than the other. At the same time the state of the mouth merits our attention chiefly those of the tongue, whether it be red, white or pale, or clean & shining or dry & hunted. As this not only shews the disease when present, but is a criterion of its acception or remission.

In some disorders we perceive a peculiar fetor which may proceed, some the breath by the lungs being affected or from the skin, some the excretions: it may also arise from particular parts of the body as in the gangrene or from the whole of it as in the putrid small pox or other diseases of a putrescent nature. There are also many qualities observable in the tongue which are

symptoms

...nations of an unhealthy state of the body
and heal sick, however, as right they also do the
assistance of drugs, besides dwelling on them here
we ought to take the more particular notice of symp-
toms because they are not only sure criterions
of a vitiated state of the body, but they are also
symptoms which cannot be concealed by the
patient and the Physician can arrive at the
knowledge of them without being very minute
in his enquiries which is often inconvenient.
XXXVI The Causes of diseases are very numerous
and are often obscure, sometimes entirely concealed.
We consider the Proximate Causes as the most
prominent and conspicuous and they are so in-
timately connected with the disease that they
instantly produce it; but if we remove or
remove the disease and in the same manner
if we produce any alteration in the former
there is always a similar change takes place
in the latter. The Remote Causes again
are divided into two kinds as follows. 1st

first

first called the Predisposing Cause comprehends all those circumstances and states of the body which predispose or make it liable to the disease by which means it is affected with it as soon as the Exciting causes are applied. The second includes all the Exciting causes which are those circumstances which produce the Disease in a body when it is already predisposed to it.

XXXVII From this it is obvious in our method of cure that we must first correct those various qualities in the body which render it liable to the Disease, called the Remote causes: then we should endeavour to avoid the Exciting causes; and lastly remove the Proximate causes. We ought at the same time to attend to alleviating or removing those symptoms which give the most uneasiness; and in that manner Diseases are either avoided, cured or alleviated.

XXXVIII The remote causes which render the body liable to the disease are always di

situated within itself although perhaps they
draw their origin from some External source:
The Exciting causes however may arise either
from an Internal or External source. It may
also be observed that a combination of the re-
mote & exciting causes form what is termed
the Proximate; and which neither of them singly
can do. And this is obvious if we reflect that
there are many men in whom the Exciting
causes will not produce the disease; and there
are others whose habits are strongly pre-
disposed to it, but who are not affected unless
exposed to the exciting causes.

XXIX. In some cases we see the body disposed to
all those causes which render it liable to disease
and only deviating in a slight degree from a
state of perfect health, but not having in powers
so much affected that it can be said to be diseased
(25) Neither however we find it living in a state
which may be truly called diseased without the
application of any exciting cause. Thus according
to the language of some became an Exciting cause
to

to themselves: and we find examples of this in ladies proposing too great a degree of tenuitability, as in such as are affected with a debility of the living solid; and also in such as are too full from a superabundant quantity of blood.

XL. We find there are no men supposed of such a strength of constitution as to resist but they will be affected with some diseases if their exciting causes are applied: this is exemplified in the small pox and low fevers which will attack the healthiest men. All men are also subject to the effects of poisons and also to intense degrees of heat & cold.

XLI. The application of the exciting causes is sometimes unable to produce a disease at first but by being long continued they will at last affect the body however healthy, and render it liable to various diseases. In the same way an exciting cause may render a stimulate one to be converted into one which renders the body still more liable to sickness. Hence we see the same

thing

thing may at one time be an exciting cause and at another as a Remote one; and of this we see examples in the different unwholesome changes of the air or climate, in Intemperance & grief &c &c.

XLII But it may be asked from whence proceeds the causes of Diseases? They certainly draw their origin from the very constitution of the animal frame. As glass is produced with from the glass house, so men are born, frail and subject to Disease Hence it happens that we see many diseases become common & all upon the application of their exciting causes in. Both we may also remark that there are some more liable to certain diseases and others to others for which there are many reasons may be assigned.

XLIII As a healthy man begets a healthy offspring so a diseased father will have diseased children. Since we see hereditary diseases transmitted to the latest posterity; and in this manner the offspring often suffer the punishment of the

their forefathers crimes. There are some of those diseases which appear only in infancy, and others show themselves at all ages. There are also some which lie concealed and unsuspected till the patient is far advanced in life, when having gathered strength they break out with double fury.

XLIV Some Diseases or Defects are born with us but they cannot properly be termed Congenital; for although the Mother should be perfectly safe the Infant may be affected by some malady while in the Womb. There are also diseases which are neither Congenital nor of the above description but which appear to draw their origin from some peculiarity in the Milk.

XLV Besides these there are diseases incident to particular periods of life and only happen at those times when the diseases arising from the various changes the body undergoes at different periods of its existence. Hence the distinction of Infancy, youth and old age.

XLVI We also observe different diseases

incident to different sexes chiefly in females and these proceed not only from the differences in the general habits of the body but also from the particular formation state and use of the parts of generation. Thus we find diseases occur in a state of virginity, in pregnancy in parturition and nursing and also in old women which do not happen in males.

XLVII The climate in which we live is a source of diseases and every country has peculiar diseases peculiar modifications whether it be cold, warm or temperate. And sudden transitions from the extremes of either are also attended with special kinds of sicknesses.

XLVIII. The air which we breathe is the source of life when rendered impure extinguishes it. It may also be loaded with noxious vapours, by the effluvia from which the body is corrupted and rendered subject to disease.

XLIX The heat and drink which we use may be adulterated with things hurtful to life. And if it should be of the very best quality, if taken in

in so great minuteness it will be unperceived produces sickness and decease.

LI. In. so notwithstanding their pernicious qualities may be given in so minute quantities that their effects cannot be perceived till at last they produce the most grievous diseases & inevitable death.

LII. In short man is subject to so many dangers from the innumerable causes surrounding that although he at some moments escapes he is every moment exposed to them. He often becomes sick from being wounded — sometimes from having his limbs fractured or dislocated, and there is some consolation to be procured. Although accidents of this kind have their origin from external causes yet they often terminate in internal diseases

LIII. Such causes as we have here enumerated have their origin from without the body but the changes it undergoes in consequence from within.

LIII. Every breath we draw produces a poisonous effect both to ourselves and others — for does this

this proceed from the expectations of the Lungs alone
for there is a highly subtile and poisonous matter
distilled through every pore of the skin which be-
ing long collected becomes a pestilent state
and being dispersed through the air and again
absorbed by the body induces diseases of the
most dangerous nature. Nor does it stop here
gathering strength by being nourished it spreads
among mankind wherever they are.

IV. If the animal actions which are neglected
will ever either too little or too much exercised they
are a source of Disease. Indolence of body & mind
depraves the powers of both and numberless fatal
consequences attend the over-active or idle.
The bountiful Parent of Nature has therefore
fixed the powers both of body and mind should
be strengthened by exercising them but to this
he has affixed certain limits so that they
may neither be allowed to remain inactive
nor be used beyond what is natural. Hence
we find the robust and active subject to
disease as well as the weak and slothful

but

but each have their particular diseases to which they are incident; and hence both too little and too much exercise produce diseases. It is from this that the various trades and occupations are subject to various & distemperatures. Hence we find races of diseased and degenerate men from many of them being bred to the same occupation and that perhaps an unwholesome one. For in many of these we find certain organs of the body much employed while others are entirely unoccupied; and hence arises a bad conformation of the body and various blemishes which impede its actions and derange its system. And from this we find that such organs as are employed acquire an unusual degree of strength while the general frame which is essential to health becomes debilitated.

LV These actions which are not subject to our will if attended to form also a criterion of health or sickness. Thus affections of the mind moderately used produce agreeable sensations, but if they are violent or long continued

tinued they impair the strength of the body; &
sometimes produce immediate death or
to worse diseases. Thus sleep is necessary to
restore the powers when exhausted, but can
the proper effect of it is hurtful both to body
and mind.

LVI. Many of the powers of the body are exercised
in a state of perfect health and if these are called
to attend & remain idle long it is not
hurtful it is attended with danger; & powers
which by nature are unemployed are called into
action by artificial means it always proves hurt-
ful. From this we may see the baneful effects
which arise from an injudicious application of
medicines. for these either produce an over exertion
of the powers of the body or expose them beyond
what is natural and ought to be cautiously
administered. Thus they either encrease or
diminish the secretions and excretions to a
great degree, or perhaps form new ones by
which the humours are drawn off more or

inwardly than they are in a state of health which can not be done without it.

LVII. As the solid parts are sometimes softened and dissolved so as to be incapable of their duty, so on the other hand the fluids are likewise condensed into solid masses from whence the action of the parts are interrupted several grand and many grievous disorders proceed.

LVIII. Lastly there are some animals which are the cause of diseases, viz such as are nourished upon the diseased parts of others Man the Lord of all the rest not only supplies food for vermine when dead; but during his life he becomes a dwelling place to them, and they not only assail him from without: but they take up their residence and are gendered within him: and gnawing his bowels while alive occasion severe maladies, and ultimately death itself.

LIX. But happily for us man is not entirely unarmed against those innumerable

ills

ills which we have at present time, nor are we
to consider them as entirely helpless when attacked
with disease. On the contrary we find the
human body is possessed of a wonderful power
within itself by which it not only is defended
against disease; but also can alleviate even
itself when attacked in many instances.
And at least by softening their violence it perhaps
its existance to an easy termination.

IX. This power in what is technically called
the Vis Medicatrix Naturæ and has been
long known and highly admired both by the
ancient & Philosophers. It is strictly able
to perform a cure in many diseases and in
all of them it is beneficial. The best and the
most effectual remedies are only of service by
their exciting, directing & governing this
power; for medicine is of no effect in the dead
body nor is it of any service when applied
contrary to the Vis Medicatrix Naturæ.

LXI. It is by this power that wounds are healed

or the flowing of blood stopped, by it the humours are joined when broken and many things hurtful to the body are expelled out of it; and in this manner many evils which no art could alleviate are spontaneously removed

LXII. From this it is evident, that Physicians may reasonably confide in this for accomplishing many purposes: and we find them always endeavouring to restore it when lost or yield as if it has entirely failed their whole practice is applied in imitating its usual mode of proceedings. It is not however to be indiscriminately trusted to for we find in some cases that it is entirely wanting; while in others its action is so violent that it would produce death if not moderated.

LXIII In the slighter diseases these powers of Nature may be safely relied upon as sufficient to effect a cure; but certainly no man in his senses would trust to them in a Dropsy, bronchial complaint or

an

of inflammation of any of the viscera, for we find in the former it is too weak to cure the disease; whereas in the latter it is so violent that they will induce a gangrene or suppuration which is most dangerous.

LXIV Hence it is obvious we must avoid putting too much trust in these; and also the condemning them as useless. For when they are entirely absent we should always try to favor their course: but when too violent we must by every means restrain them by following a different plan.

LXV Nature herself shows that the study of the physician is not entirely confined to these narrow limits, for she has produced a great number of remedies which when properly applied have a great effect in producing salutary changes in the human body. And in this manner the skillful practitioner can correct many of the causes of disease and remedy for them; as for instance what in one case will

will endanger life by taking too violent: may in another case by the application of proper remedies be made to operate as a cure. (47 -36)

LXVI. It is the business of the Physician after having made himself acquainted with the nature and cause of the malady to effect such a change as he knows will convert the disease into a state of health. And this is what is termed Rational Medicine or Dogmatical. There is also another method of curing called Empyricism where all these narrations are laid aside. and the cure is accomplished by the application of such remedies as are thought to have a certain efficacy against certain diseases.

LXVII Every traveling Quack boasts of these sovereign remedies of this kind and every old woman believes in them. And those who confide in them even although deceived (which they generally are) seldom become so wise as to avoid them; nor can they convinced

of

of their ever even after they have lost both their health and fortune by their practice; so gratifying is the passion of hope to the human breast. The most skillful of the Medical tribe have regretted that the composition & use of these quack medicines have been discovered, as perhaps some of them are of important use. For we need not wonder that there are many remedies of considerable efficacy whose powers have not yet been thoroughly investigated when we see there are so many diseases in whose nature and causes are still unknown. But we have reason to think, the great progress we make in the science of Medicine the more easily we will discover the powers and mode of acting peculiar to certain remedies.

LXVIII The only rule in prescribing medicines is their known effects upon the human body which are specific either upon the solids or fluids. In the former their powers are used in contracting or nourishing them; in strengthening

on

or debilitating them and in irritating or deaden-
ing them. The fluids are acted upon by altering
their quantity or quality, by concreting them
or their vehicle and by evacuating them either
through the natural passages or others arti-
ficially made. We also find remedies against
concretions when formed within the body
and also against such animals as are the
cause of disease (p. 58.). And this science
which teaches the effects of medicines and their
mode of operating is known by the name
Therapeice or the art of healing.)

Chap. IX

Of the solid parts of the Animal Body and its various properties both Chemical and Mechanical. Conjectures concerning its formation. Of the Cellular substance. Of the nature origin and use of the Fibe.

LXIX The Human body consists of solid and fluid parts by the mature action of which its functions as far as corporeal are performed. Both of these are subject to be changed and also are restored when lost, but the solids are much more slowly generated than the fluids. In our description therefore it is proper to begin with the solids because it is by them that the body owes its density and form.

LXX The solid matter of which the bodies of animals are composed is termed the Animal Solid for the sake of brevity. And it is possessed of various properties of a chemical, mechanical and vitale nature all of which are well deserving the attention of the Physician.

LXXI. Medical men have been long employed trying to discover the properties of this

this solid by chemical principles. And they have found that it is capable of being resolved into its elementary parts in two ways viz. either by spontaneous putrefaction or by the action of fire, or what is termed the dry analysis in the language of Chemists. There is likewise a third though less perfect mode of resolving the animal solid into its component parts and this is by maceration in hot water by which all the glutinous part is dissolved and suspended in the water and the earthy portion is left. This process gives the same results as the two former if the glutinous part be subjected to a more accurate examination by fire or by allowing it to putrify.

LXXII. By these modes of investigation we find that the animal solid consists of an earth, an oil, a salt and water with a portion of Phlogiston and a considerable quantity of Phosphoric air. And these elements are found in various proportions in different parts according to the different mechanical purposes to which they are assigned as in the hair

hardest

hardest bone or tooth & the soft and delicate
retina of the eye. Nor the chief difference be-
tween the solids and fluids of the animal
body consists in the different proportions of
the elements which they contain the solid
having the greatest quantity of the earthy mat-
ter and the fluid abounding in water.

LXXIII It has long been a question among medi-
cal men to which of these elements we ought to
ascribe that adhesion which keeps the
whole together. Some have ascribed it to the
earthy part, some to the gluten and other. To the
air: and it has been thought by some that
they mutually assist in binding each other.
Perhaps indeed it is a more likely opinion &
more agreeable to Philosophical principles
that each of these elementary substances is
kept to the rest by its own cohesion; and that
one of them acts as a cement to the rest. And
this is still more probable if we observe that
the increasing or decreasing quantity of
them produces a corresponding alteration in

the

the whole mass.

LXXIV. Nor are the elements of the animal solid so strongly attracted together but we can perceive an approach to dissolution even during life. And although putrefaction proceeds but slowly at this time; yet immediately after death the body becomes putrid, if there is as much air left remaining as produces any action among the parts. And the greater the heat is, the more rapid the advances to putrefaction. During which process the mephitic air is exhaled; the volatile salt which the body contains is dissipated; and in this manner the adhesion of the parts being broken the whole passes into a putrid mass: and all the volatile parts flying off leave nothing but the earthy behind.

LXXV. But for all that has been said our knowledge of the composition of the animal solid is still very imperfect. For none by any combination of those elements which chemistry

has

has discovered in it has been able to join
flesh; and hence we infer that we are able
ignorant of some of the component parts
of it, or perhaps we don't know the manner by
which these are joined together. In this respect
it differs from other substances which have
been made the objects of chemical researches:
for instance if we combine those
substances again which have been separated
by chemical operations we can form a new
body possessed of the same properties as that
which was dissolved.

LXXVI. But although our knowledge in the
chemical properties of the animal solids is
very limited, yet as far as we know it is at
present with this good effect. By it Physicians
are enabled to discover the nature &
cause of many diseases, and thereby to ap
ply the remedies proper for them.

LXXVII. The mechanical properties by which
the animal solids is rendered fit for the purpos
es of life, are these viz Solidity, a proper degree

of softness or flexibility, and lastly a great elastic
power: the various functions of life consist
chiefly in the performing different motions pro-
per; and without which the body cannot be
viable in health. And on this account there
is a necessity for a considerable degree of soft-
ness that the parts may be able to perform
these motions without any danger of laceration.
In the same manner the solids require
to be soft and flexible that they may be bent
with impunity which some of them are more
or less during the performing of these motions
Lastly it is also requisite that these parts,
which are bent or contracted should be able to
return to their pristine forms, and this they do
by their elasticity as soon as the power which
bent them is removed.

LXXVIII. These properties are subject to consi-
derable variations; not only in the different
parts; but also in the same parts in different
ages; and even in the same men at different
periods. In some cases these changes though

sufficiently

insufficiently apparent but affect the health;
but in other cases when they are to any con-
siderable degree they produce very severe dis-
orders.

LXXIX. The mechanical powers of the solid
parts are liable to be vitiated in two ways viz
either by a superabundance or defect of their ad-
hesion, softness or elasticity. When the adhesion
of any of these parts is encreased its elasticity
is also: and in like manner its tone is di-
minished by an encrease of its softness. And up-
on its adhesion being lessened its softness is
augmented and its elasticity diminished

LXXX. There are many causes may be assigned
for this variation in the mechanical properties of
the animal solids, but they are generally reduced
to certain heads. It may proceed, primarily
affected primarily in the chemical composition &
in matter, or the composition may be perfectly
good and the fault ~~in the part~~ lie in some
mismanagement of its parts so that the at-
traction for each other may be either too little, or

too

and great. With regard to the chemical composition perhaps all the elementary parts (¶ 2, 3) may be in it; but they may vary in quantity as perhaps some one of them may be entirely. Of this however our knowledge is very imperfect; all we can say with certainty is that the moist part consists chiefly of water; and the dry is composed of the other elements; and we also find that the greater the quantity of moisture the less is the cohesion and elasticity, and the softer it is; while a superabundance of the dry parts produces the contrary effect.

LXXXI. There are many remote causes of disease (¶ 29) from excess or deficiency of the dry or moist parts of the animal solid. The constitution of every body, however, with respect to these two, is a considerable degree. Thus we see that some men are of a quicker and harder temperament than others; and all men are more so than women; but can this be altered by any change in their way of living.

LXXXII. We have also remarkable effect in

inadequate

producing that dry temperament of the body for from the moment of our birth it daily becomes drier and more dense; as we see at all periods from the crude fœtus which at first is almost entirely fluid to the dry rigid old man whereas to his youth no other cause but the want of moisture

LXXXIII. Age makes us less quantity of moisture in the body and we see produces a corresponding alteration in the animal state. And this has been long observed in other animals and even in man it has its effect. Hence it is that we wonder at old men when we reflect how nearly the habit of the body is changed by the nature of the food we use; but even the mind may in some degree be affected as we daily see from

LXXXIV. Habit and custom in the food being perfectly accorded and our bodies admitting the proper quantity of nourishment, hence it is that has great weight in affecting the animal state.

LXXXV. The state of the air has also a considerable effect upon the state of the body and its moisture

on

or Oxygen; hence the inhabitants of elevated dry situations are very different from those of low marshy countries.

LXXXVI. Lastly, the manner of life has also its weight in this respect; thus exercise which exhales and drives off the superabundant moisture has a very different effect from an indolent or sedentary life which always increases the moisture.

LXXXVII. But allowing that the chemical composition of the water is perfectly natural they may be affected from other causes. The elasticity of the particles may be increased from some mechanical cause as by heat or cold, and this will produce a variation in their firmness & elasticity.

LXXXVIII. The experiment of Gilbon in stretching a cord plainly shows what great effects pressure will produce in this respect: and the change produced by distention is no less obvious.

The more the animal solid is distended it becomes the harder and firmer, and also the more elastic and the more it is distended the greater a power it requires for distending it. And if

the

the continue to overcome the power it is attain'd
to, is sunder and broken by the adhesion of
its particles being overcome. Thus we may
plainly see the reason of the increase of the
body, also its nature and diminution. And by
this we may also explain how it encreases in
density every day; and lastly how it is next
to inevitable death in Old age.

LXXIX. The many motions of the solids there
fibres may have some effect in altering their
density; but we know of a certainty they are
liable to be changed by exercise or idleness. The
general effects of which whether good or bad
are very conspicuous.

XC. Besides when those parts destined by nature
to motion are allowed to rest for a long time
they become rigid and immoveable, and it takes
a long time before they recover their motions
but on the contrary by frequent motion, not
only particular parts, but also the whole body
acquires a wonderful degree of flexibility.
Nor can there be a better remedy for stiffness of
the

the joints occasioned by their being long in one position, than frequent exercise, which although it may at first be difficult, it becomes daily more easily performed.

XCI. Heat affects the whole body by relaxing and expanding it; and cold renders it more close and hard, but the effects of both are various in the human species. Although the body in general retains a certain degree of heat yet its surface is always affected by the surrounding air whether hot or cold. And we may readily see this by observing how languid and dull an inhabitant of a warm climate appears besides those who are in our colder ones; the former moving every limb with great difficulty while the latter is firm and full of agility.

XCII. In the experiments detailed by Bryan Robinson in his Institutes we can see that a combination of these causes which affect the animal solid will always produce the greatest effects; and closely examine, shows that

this in the changes produced by the use of the warm bath.

XCIII. It is from the animal solid that the various organs of the body are enabled to discharge their different functions, although we are not yet certain in what manner the elementary fibres of this solid are formed whether it be of minute fibres laid longitudinally; or of Reticular webs of fibres intercommunicating in all directions. Later discoveries have thought by fibres running in a serpentine direction as in veg. cellular. Lastly, if they are formed of laminated fibres such as those of the cellular substance which Haller does not prove composes the greater part of the organized body.

XCIV. We shall describe the nature of these fibres in the next sect. The **Cellular Substance** is observed to be diffused through every part of the body and in many its fibres are manifestly seen. It surrounds and binds together all the various parts and in such as are destined

destined for nutrition it always connects itself readily to those adjoining. These vasa fibrosa when of a proper density constitute the firmer and slenderer parts of membranes; and even the most simple when properly examined appear to be of the same structure.

XCV The cellular substance is often observed to increase in a wonderful manner [illegible] these membranes & especially when composed of the most fine first slowly and as it were imperceptably [illegible] any rapid distention of them either by fluids or air renders it thinner. It is likewise observed to insinuate itself between contiguous parts and connect them together which naturally were separated. Adhesions of this kind are often met with after inflammations of the lungs and other viscera and are always of the same structure with the cellular subs.

XCVI It is likewise observed to grow spontaneously if it has been cut or otherwise separated. But in cases of extensive separation where

From what is mentioned I may observe that our food ought to increase in moisture as we advance in age; unless in cases of dropsy or other complaints where too much fluid aliment is improper

86 Hence we find people of a sedentary life who indulge freely in eating & drinking most inclined to obesity; and possessing a greater proportion of moisture

90. Hence a gouty limb becomes stiff, and if any pain or other cause prevents a limb from being moved for a length of time the joints all become rigid.

(see p 24th)

95 I have just now a case of adhesion between the eyelid & ball at the external angle of the left eye occasion by burning with gun-powder. The connection is so close that several large blood vessels have been formed which running upon the ball have produced a degree of opacity or film upon one side of the cornea. The Plan of cure intended to be followed is to cut these blood vessels & separate the adhesion by a scalpel; and to prevent its reunitive adhesion until healed the incision is sealed.

where a great part of it has been lost it is nearly entirely ~~destroy~~ restored but leaves an ugly scar.

XCVII From what has been said we may see how different parts of the same or of different bones may be joined together, by these concretions. And it is upon this principle that the art of Ratisseritis depends if these concretions are upon this too depends the art of transplanting teeth.

XCVIII. The cellular substance in some places resembles net work and in others appears like fat. In all those places where a greater portion of it might occasion by its weight a compression; as in the head, lungs, eyes or eye-brows or in the penis or scrotum and it appears lax and similar & net work and there is no fat collected. But between the muscles and about the joints, also under the skin and abdomen, chiefly about the kidneys we always find a great quantity of fat.

XCIX This fat is a pure animal oil

very

very little different from the oil we procure from vegetables; During life it is fluid but differs in thickness in different parts of the body. It is secreted from the blood: and as readily reabsorbed by it although we cannot collect it in a pure state in the blood.
C. It is very probable that the oil is converted into gluten by digestion partly in the bowels and partly in the Lungs; and that it is again secreted of the quality of oil.
We do not observe any secretory organs in the fat: but in all those places where fat ought to be we find the cellular substance of such a structure that it retains the oil when secreted and does not allow it to pass off. We also find that in all those places where the cellular substance is not circulated there is no passage for the oil: although air and water are readily diffused from the head to the feet of the body.

C1. In the fœtus we do not find any fat and all

with

birth there is very little; but when infants are properly fed they generally become fat before they begin to walk and are able to exercise themselves. After this they become leaner and commonly continue so till they arrive at manhood being more or less strong according to the degree of exercise they take. They then become generally fond and in some cases very fat till old age when they again become lean and fall off by degrees. Females turn fat and plump about the age of puberty: hence that fine shape and captivating form which indicates woman hood but in general women are fatter than men at all periods of life. The more lax and flaccid a habit of body a man has the more apt he is to become fat.

CII. The fat is produced by the use of much animal food which is of oily and nutritious nature is properly digested. Many drinks chiefly mucilaginous contribute to this as well as ease of body and tranquility of mind: castration and coolness

and

much sleep and stupidity bleeding frequent bloodletting and other evacuations. Sudorifics evacuate pursues health and diminishes the vitals and animal functions is favourable for the generation of fat. Flesh is also a good deal decays upon the temperament of the body for this purpose for we find we cannot fatten a man ad libitum as we can an ox.

CIII. A certain age a proper degree of fatness is a sign as well as an effect of good health. But when it increases to an unnatural size it becomes a disease itself and the cause of other diseases. A man however in all cases be kept down if the person has strength and resolution to take plenty of exercise and little sleep and confine himself to a spare dry diet. We seldom meet with a common soldier who has that to such a degree as to become a disease.

CIV. The fat always constitutes a considerable

able portion of the body and in some cases it forms the greatest part of it. Hence we infer it is designed by nature for some particular purposes. It renders all the movements free and easy by moistening the moving parts and preventing their friction: by this means it keeps the solids from wearing which otherwise would be the case. Likewise prevents the neighbouring parts from incumbering & preternatural size; as we find they are very ready & ob where the vessels are raising the fat have been destroyed by ulceration or any other cause.

CV It also contributes to the beauty of the body by filling up the unseemly interstices there would be between the muscles and making it round & well shaped. It is from the fat that the body receives its fine clear waxen colour which is so beautiful a shade when mixed with a proper quantity of red as we see in the cheeks. Hence that girls of a very full habit of body have the fine colour of the cheeks by the fat increasing the inspissation thereof the blood.

CVI It is thought that the fat nourishes the body by

by being absorbed by the blood, but this opinion
is not quite certain: It is found in the body, how-
ever, and hence we find the inhabitants of cold
countries best supplied with it.

Chap. III

Of the living Soul & Nerves endowed with an account of its propagation and uses; also an enumeration of the different opinions which have been formed concerning its nature and action.

CVII These parts in which the chief seat of the powers of sense and motion are known by the name of the living or animal Solid. And these properties depend upon the life & from their origin and communication with it in which respect they differ from the properties of the solids which were mentioned in Chapter: which are found to retain their motions after death.

CVIII The parts subjecting these powers of sense and motion are the Brain, little brain, the Medulla Oblongata and the spinal marrow; likewise the Nerves deriving their origin from these and which are distributed to the organs of sense over the whole body

by and even to the muscles themselves.

CIX. Sensibility is much more generally diffused than mobility; for although the former has its origin from the nerves alone it is communicated through all those parts already mentioned. But mobility is confined solely to the muscular fibre. Hence in all places where we find sensibility we there find nerves, and where there is mobility we infer that there are muscular fibres.

CX It is thought however that mobility depends upon the connection between the nerves and the muscles. For we find wherever a nerve is cut asunder or compressed with a ligature the muscles upon which it is diffused lose their power; and the same happens if the brain itself or the origin of the nerves be in any way vitiated.

CXI. It is the opinion of some that the muscles derive their origin from the nerves and are formed

106 But there may be another reason for the inhabitants of cold countries having a greater proportion of fat than those of warm for as we find the fat is composed of the fluid parts of food; the great perspiration which goes on in a hot climate, may operate in preventing its settling in the body a circumstance which cannot occur in a cold situation where the body does not perspire so much.

formed of the same matter. And indeed they are exactly similar in their structure as far as they are both composed of very minute fibres, and both of them white as we find when a muscle is cleared of its blood of which it has a great quantity: but even the best glasses discover no difference between the fibres of a nerve and a muscle which we find running into each other. Besides we find the sensibility of both is affected in the same way, by stimulants of medicines whether they be applied to the nerves or to the muscles.

XII We have elsewhere shown how difficult it is to discover the true origin of many parts of the body, whether we are to consider them as all formed at the same time, or that they all receive their origin one by one from some certain beginning. In the mean time however it is certain that we can easily see many of the muscular parts in the foetus state; and these possessing considerable strength and power when the brain is only in a state of embryo. Fluidity

so

so that it is from the action of the muscles it is able to perform its functions and receive its increase. Besides we find the muscles are always of a more firm texture than the nerves: and the former possesses in themselves an irritability which the latter never does.

CXIII. We may therefore infer that either the muscles are composed of a quite different matter from that of the nerves or if they are both the same there must be a very great difference in their structure as there is so great a difference in their powers. But if the muscular and nervous matter is different it is evident there must be a great deal of the nervous and tunica mixed with the muscles. For we find we cannot wound the smallest portion of a muscle but there is always a great many ramifications of the nerves either tunica or fibrous.

CIV Since therefore we find both from the functions and structure that there is so intimate a connection between the nerves of the nerves and muscles they

may

may without impropriety be both designated by the name of living solid as parts of the same body; and we find they are known among medical authors by the name of glands and known as Glandular bodies.

CXV. The investigating the wonderful properties of this substance has long engaged the attention of Physicians & Philosophers; and many celebrated men (among whom we may reckon the great Newton) have devoted their time & applied its powers, but each of them has only advanced such conjectures as appeared most probable to himself for as yet there has been no mode of subjecting its effects to the test of experiment; and we find that after the experience of more than two thousand years the conjectures of the most learned men are of little avail in discovering the real nature. There are some writers who have most undeservedly abused Newton upon this subject; pretending that his opinion upon it ought either to be implicitly ad-

opted

adopted in that it should add the influence of his authority; although he with that prudence and modesty, which is often admired than followed, gave his opinion on this subject rather as a conjecture or question to be afterwards either refuted or confirmed by proper arguments and experiments. But in this instance we are not blindly to adopt the conjectures of Newton as real, nor if we imitate him in this respect will we ever be able to advance our knowledge in this science.

CXVI. There are very different opinions concerning the mode in which sensibility and motion are conveyed through the body; but as they are all grounded upon the same principle, perhaps they are all erroneous. It is thought, that they are propagated by means of some certain motions in the nerves which are peculiar to them; and that beginning at the organs of sense pass from them through the nerves to the brain, constituting what is called sensibility or perception: and commencing at the brain

it

it passes through the nerves or some similar though distinct bodies enclosed in the same coats with them. The muscles are organs of motion enabling us to move them in the places.

CXVII. Some are of opinion that these motions are conveyed by means of a vibration similar to that in the nerves similar to that in the parts of a stringed instrument.

CXVIII. There are others who observing how intimately both the brain and nerves are perpetually agitated by vibrations, both on account of their own softness, and also their near neighbourhood to other parts by which they are agitated, have rejected this opinion. And maintain that the motion is conveyed by means of some very subtile fluid, which they say circulates in the nerves; and is governed by laws peculiar to itself and properties of very wonderful properties.

CXIX. There has also been authors who have ascribed the propagation of the nervous

energy

energy to a peculiar modification of that u
niversal Ether which many Philosophers have
maintained pervades the whole world. It was
by it they said the stars moved and the sun
shone; by it too the seas flowed and ebbed; and
the rivers ran in their courses. By its action
too they ascribed the blowing of winds, the grow-
ing of plants and even the thunder of Jupiter.
It might however be observed that this very
useful and potent Ether was never detected in
any substance so as to be made the subject
of experiment that its laws might be inves-
tigated. It was more facile and changeable
than Proteus himself; and after having been
long spoken of it is now allowed to rest in
peace without any hope of its being ever dis-
covered. See Gregory's Conspect. vol. 1st p. 6th See note

CXX. In their comments upon this and similar
subjects however medical writers ought to be very
slow; for they ascribed these motions of the nerves
to the operation of this ether before they had discov-
ered

concerned that it existed; or that there were such motions: and from the circumstance that they acted upon the subject only immediately by vague conjecture which is by no means calculated to solve the difficulty. For if we call to mind the arguments upon the subject of the ether and the motions of the nervous energy they amount to nothing: for neither the motion of the ether nor the vibrations of the nerves whatever the velocity of these may imagine) could communicate sensibility to any thing like it: nor can they by any of the known laws of nature be considered under it.

CXXI. We are now enabled to shew in what manner a portion of the mind which has no connection with any thing corporeal can operate upon this ether however subtile it may be; more easily than it could operate upon a stone; in that what way it can put the one in motion more than the other.

CXXII. And in this respect we are still more

difficult than

difficulted to explain the causes of what are called internal senses viz. memory imagination and judgment. we can hardly believe that any motions of the nerves can be retained and laid up as we please, and again called forth and renewed; neither can impressions or traces of any images be made upon the brain by those motions as the impression of a seal upon wax which we can contemplate again and again as we please, or renew those motions by which these images were first formed. yet we must require to be able to do this before we could have such clear ideas of things which are past or remember thoughts which happen in our sleep.

CXXIII These motions if there are such would be equally necessary for the operation of both the external & internal senses. It is also further obvious that the sense must either precede the motion in point of time or the motion the

sense

119 "Nam modo te juvenem, modo te videre leonem,
"Nunc violentus aper; nunc quem teligisse tenerent,
"Angvis erat; modo te faciebant cornua taurum:
"Saepe lapis poteras, arbor quoque saepe videri.
"Interdum, faciem liquidarum imitatus aquarum,
"Flumen eras: interdum, undis contrarius ignis."

Vid: Ovid Metamor: lib VIII. l732.

cause, or both must happen at the same instant. If therefore the cause proceeds in the motion it is obvious it cannot proceed from any motion of the nervous fluid but must have another cause: but if the motion in fault must find a motion cause, be it as it can not proceed from the cause or habitude which is faulty: And lastly if both happen at the same time we must seek a cause for both as neither of them can be a cause to the other; for nothing can produce an effect before it is in itself.

CXVI We can hardly conceive how any change or alteration can be made in any corporeal substance without being directly or indirectly connected with some motion. The thing then is here upon it is the sensitive faculty both external and internal, and the habitude or power by which the muscles are moved, since therefore not being corporeal it cannot be explained upon the same principles as corporeal

confirmed things.

CXXV. Therefore laying aside all observations on this subject which nature has concealed from human search as perhaps useless for us to know, or utterly beyond our comprehensibility; it would be much to our improvement if medical men would confine their researches to investigating such points of cases as are known facts.

Chap. IV

Of the sense, and its varieties and uses. Also what gratifies or pains it. and its faults.

CXXVI. The sensitive faculty requires no definition and although it is very simple and easily understood yet we cannot readily give a definition of it. But although it cannot with facility be described yet we can explain its operations and properties. Though with a long circumlocution, of words which are of little use and often not very accurate. We can however readily distinguish any change in the state of the mind from the effects it produces upon the body.

CXXVII But although at first sight the sensitive power appear to be simple; yet Philosophers in their searches into its nature, have discovered that it is of two kinds; and the distinctions are to be carefully distinguished between the two properties belonging to the senses, because in common language they are often confounded under the same title. No mountebank even of common ability could ever confound these

these two things together; and therefore the philosophers have warned us against an error, which only the vulgar could possibly run into, and which therefore is of little importance.

CXXVIII. The first of these (is the change in the conception of any thing made in the mind) and belongs to the mind alone; and it is impossible for any thing, in its nature that is thus simple, it can neither be defined nor described by any words. It is very different from that change, which the perception of any external object makes in the mind; and is in its nature so contrary to any corporeal substance, that it cannot be compared to any thing which we perceive.

CXXIX. The second of these is what is commonly called sense, and is that perception or knowledge of the qualities of any external object which the sense, or the change of the state of the mind, represents to us; and which is very different from the former

ner. The qualities of external objects which we perceive by means of the senses belong to those objects alone; and they cannot consist in any condition or change of the mind; nor do they propagate any thing in common with the mind, being always unlike. And the same whether we perceive them or not. Neither are these so simple as the first by means of them can be accurately described, and compared with each other.

CVIII. We may easily acquire the most important part of our knowledge of external objects without any labour by means of the senses, (that of feeling and being) Hence we infer that the Almighty architect has given them to us in a state of perfection and designed for the purposes which we apply them but as the senses dont convey perfect knowledge. From the above hints some knowledge of matter in every instance is

easily

easily attained; but it is evident from many circumstances that all our sensitive faculties are subservient to the wisest purposes.

CXXXI. The faculty of sense appears in a healthy man whenever the state of any part of the nervous energy is altered; and whether that alteration or change proceeds from an external or internal cause. But there is this difference that the sense which proceeds from the former is said to arise from an impression or impulse, and that proceeds from the latter is termed consciousness.

CXXXII. We however observe that sensibility does not follow every impulse which is made upon the nervous energy; for the impulse must be made with a certain force and that upon a part endued with a sensitive power. If the impulse be too small the sense is indistinct or perhaps not at all perceptible; and if it be too great it excites pain

pain and no distinct sense or if the impulse is made to a very great degree it destroys the organ of sense & stupifies it.

CXXXIII. The production of sense also requires the impulse to continue for some space of time or it cannot be distinct; motion will an increase of it answer for a deficiency of duration. Hence we find that curvilinear bodies may be moved with so great celerity that they cannot be seen. And it is upon this principle that all juggler tricks are performed, for the whole art of them is to make the motion quicker than the sight

CXXXIV. When the impulse ceases and the external cause of it is removed the sense it self will continue after it for a very short time. Hence the circular ring of flame seen when a burning coal or flaming stick is whirled round in a ring.

CXXXV The sense however is not so much of a

a corporeal nature, but it depends considerably upon the state of the mind. For if the mind is occupied upon any other thing, a sufficient impulse may be made upon the organs of sense and yet not be perceived. And on the other hand if the mind be unengaged although the slightest impressions may be unobserved yet we can readily observe the slightest ones.

CXXVI. This plainly this circumstance in a great measure that men accustomed in some employments acquire a wonderful acuteness of some of the senses by frequently using them although this improvement may arise from the strength and perfection of the external organs of the senses they use which they acquire by exercise. And it is obvious this is particularly applicable to such organs as are moved when used.

CXXVII. Attention is in a certain measure subject to the will, but it is not entirely so in such circumstances as affect the senses most

most strongly by being new, pleasant or unfamiliar and also which produce unusual effects upon the mind.

CXXXVIII Hence we find many things occur which although they make the proper impulse upon the organs of sense; are not observed or if they are so it is in a very slight degree and immediately pass into oblivion. Hence too upon the other hand any thing new or uncommon is most observed as producing the most lively sensation upon the organs of sense. From this too sensations or impulses which are often repeated although sufficiently strong become familiar and soon pass unobserved; or perhaps by the impulses being frequently repeated they become more weak and leave hardly any traces of them on the mind.

CXXXIX Man appears to be only capable of one sensation or of enjoying the perception of any one external object at once. But the transition from one to another is often so sudden

sudden that at first sight he would appear to be capable of embracing more than one at the same time.

CXL. We are however capable of perceiving more than one sensation at a time provided they are of the same kind and so combined together as to form but one. These different impressions may be made in two ways so as to be perceived as one; that is they may be both made at the same instant of time, or they may follow each other so rapidly, that the impulse of the second may be made before that of the first be effaced, for we have already seen that the sensation continues for sometime after the impulse or cause of it is removed: especially if proper attention be paid to it: (134. 135). We have examples of this in the combination of different sounds in music: or if one should run a pencil over a piece of pasteboard with various colours painted upon it so rapidly, whilst it is turned

round

mind, it exhibits that colour which is a combination of the various colours used to make it if they were mixed together. The same thing is observable in simple odours and tastes which by combination form new and different tastes and smells some of which are pleasant & others not. This is the foundation of the arts of cookery and perfumery. The sensations which result from feeling however are so very different in their nature that they cannot be combined in this way for a combination of any of them gives no medium sensation as in those above mentioned

[XI.] Although the impulse of external causes may be sufficiently strong and of a proper duration, yet there are many things peculiar to the body which must be in a proper state before the sensation is complete. In the first place the mind must be in a proper condition so as to give attention. The brain also must be

be sound so that there be no delirium, torpor or sleep. The nerves which pass from the brain to the organs of sense must be in a wholesome state, perfectly free from compression or any other injury. There may also be defect in those organs which terminate the nerves, either from some unnatural formation of the body or from the application of an unusual degree of heat or cold, before the impulse is made. The nerves may also be hurt by a vitiated state of the blood or peculiar accompany them; by these being in a state of inspissation or undistention which takes place when they are inflamed. Lastly the senses cannot be exercised unless those parts which constitute the terminations of the nerves are perfectly sound and of a proper thickness so that they may be calculated to receive those impressions which are usually made upon them. Of these we may mention the cuticle which covers the whole body and extends to the internal

ears

and also the various humours of the eye.

CXLII. There are sensations or senses which occur without the aid of any external cause. Of this kind are the various states of the mind as thought, memory, imagination, will, and all the various desires of which the mind is conscious. Besides these the different states of the body are referable to this head as vigour, debility, alacrity, torpor, restitude, pain anxiety, itching likewise the cravings as hunger and thirst: and the inclinations as those which precede weeping, vomiting and stool and the like. We now refer these, as far as they are confined to the sense of feeling or touch.

CXLIII. We cannot reduce both the External and Internal senses into classes and genera with accuracy. But the External have always been considered as forming five genera viz seeing, hearing, smelling, tasting and touching. With regard to the four first of these, each of them is only capable of discovering a few of the qualities

qualities of external bodies: and these qualities are easily slipped together and reparable to that sense alone by which they are discovered. Because each of these senses hauue their own peculiar organ and that in only one place of the body for no impulse in any other part of it can excite the same sensation which an impulse on their organ does. Besides these organs can influence the sensation by an impulse made in a peculiar way viz either through the mean of Light, the tremor of the air or the flying about of particles. And lastly because the perceptions arising from each of these organs although they may appear very widly differing among themselves, have always something in common with eachother by which they can be compared and their similitudes and differences easily discovered.

CXLIV. These observations are most applicable to the circumstances discoverable by the eare nose or tongue for those which the eyes discover

discover are more numerous and have to us a
resemblance & coexistence; for by them we are made
sensible of colour, figure, size and motion. —
But all these are easily reducible to the same
sense, because we discover them all by means
of the same organ or through the same medium
as it is called, and by the same kind of impulse.
The other perceptions however dissimilar they may
be are all referred to the sense of feeling or touch.

CXLV. The senses in general were found to be either
agreeable or disagreeable to us in the exercising
of them; and this not only arises from their making
us conscious of the existence of external
bodies and representing their qualities to us, but
in exercising them there is a certain sensation
raised in the mind which pronounces being either
pleasant or painful makes us wish for a continu-
ance or repetition of them or not.

CXLVI In some examples this pleasure arises
from the sensation alone (or the change which
the impulse makes in the state of the mind)

but

But in others it is not the sense but the conviction of quality of the object which we perceive by means of the sense which gives us the pleasure and this is what is called the perception.

CXLVII. There are examples of the first of these in the pleasures arising from the sensations of taste, smell, or hearing and also in the sensation of warmth which is communicated by touch. For these it is the sensation alone which must give us the pleasure or pain, for we can learn nothing of the nature or quality of the external body by them. If we have therefore any knowledge of it it must be from our judgment, aided & guided by observation, experience and reasoning.

CXLVIII. We have examples of the second in all those pleasant perceptions which we are sensible of by seeing or touching external bodies; thus the pleasure we feel in contemplating beauty of form in observing proportion or gracefulness of motion and from hence that arising from order is to be ascribed

ascribed to the same cause, likewise the quality we feel in touching any thing which is well shaped, smooth or soft. In these examples it is the perception which pleases, and the sensation or change produced in the mind, by which we discover these qualities in the objects is not regarded at all.

XLIX. It appeared very difficult to explain why so very different sensations were produced by the various impressions on different organs of the body (148, 149.) But it is much more difficult, to explain why these sensations are excited by almost every sort of impression upon these organs, and that these impressions not only represent the same perception to every mind (128, 129.) but however often they are repeated they produce pleasure or pain in those mind at each repetition.

CL. For the senses, however different they may be from each other, according to the various organs

organs and parts connected with them, are always the same with respect to the objects they represent and are all subsequent to their own proper causes. for the same impression does not communicate a different sense or perception to the same person at different times; neither have we any reason to suppose that the same impression communicates a different sensation to different persons. unless it be in some rare instances and in which probably arises from some serious defect in the body or at least from some unnatural state of the organ.

CLI. But we know that the pleasure and pain or uneasiness which accompany some sensations differ very much in different men; and in the same man at different times.

CLII. The force of habit in those pleasures which arise from the senses is exceedingly great but in the sensation itself it has little effect and perhaps none at all in the perception of the

the qualities of external objects which the senses discover to us. For no man in health will judge the taste of wormwood to that of honey to any thing bitter to that which is sweet; but by a singular constitution of the body and by habit alone the taste of the bitterest herbs may become more agreeable than that of the sweetest.

CLIII. Although the most of sensations produce either pleasure or pain, there is a very great variance among them in this respect for some of them are by nature agreeable to all men and others the reverse, and some of them are so indifferent that they neither produce pleasure nor pain. But there have been no causes assigned for these effects nor the difference of them.

CLIV. It may however be of use to know that the same sensation may be made agreeable or disagreeable (without changing its nature) merely by increasing its violence. For there is no sensation however pleasant the enjoyment of it may be

be, but what will become insipid and even intolerable if it be too intense. And on the other hand those sensations which are painful in the excessive; if we deminish their intensity the pain becomes slighter and will be easily borne; and in some cases may be even pleasant to a certain degree.

CLV. It is upon this principle that many sensations which are at first pleasant cease to be so when frequently repeated, although their nature and violence continue the same as far as respects the impression they make: and many of those which at first are painful at last become pleasant without any change having made in the force of the impression. Because sensations frequently repeated become familiar to us by custome; being for a while perceived carelessly (138.) and at last altogether neglected the mind giving no attention to them.

CLVI. From these circumstances we can

explain

the reasons why more sensations give us more pleasure? why a change of these is so agreeable to us? and why we desire the strongest sensations or at least such as make the greatest impressions upon our organs of sense? that we may as it were increase or prolong the gratifications they give us. And why we attend so little to those pleasures that we cease even to enjoy them after we have lost them? From this we can easily assign the reason of boys preferring a greater liveliness of mind than do men; because they feel the effects of these numerous pleasures more, from their being new to them. And this will be obvious if we suppose a person to be suddenly endowed with the senses who had never enjoyed them as in the case of a blind man recovering his sight, he would enjoy all the gratifications from the use of that sense which he had lost by their being familiar to them, they would not reap the same pleasures from them which he would do.

CLVII. The senses are in general so strong that they are easily distinguished with accuracy; and each of them is capable of giving pleasure to a certain degree according to its nature. — But as there are various kinds of pleasure, so the different senses produce different degrees of it in the mind. All men are not equally delighted with contemplating the splendor of the meridian sun; nor all the beauteous variety which nature displays: neither does the most harmonious concert give pleasure to every ear, for there are some who contemplate the gloom of a cypress, or the shade of a grove by moon light, with as equal degree of pleasure though of a quite different sort; there are also others who feel a certain pleasure in the dead of night, or while listening to the humming of bees, the agitation of the air by a slight breeze or the murmuring of a rivulet. And there are times when darkness, silence and the want of all sensation give greatest pleasure

CLVIII. Hence we see there are well defined li-

mits

limits set to the pleasures which arise from sensation is that they can neither be too much increased, too frequently repeated, nor too long continued; as if nature had taken this way of showing us that man was not created for the enjoyment of pleasure alone, at least of pleasures of this sort. For when too much pushed it produces languid uneasiness, and sometimes becomes even offensive and painful. And as pleasure thus readily passes into pain and uneasiness, so a sudden transition from pain to ease produces a more lively degree of pleasure; so that [illegible] such a change could be brought at any price there would not want purchasers. Hinc illæ lachrymæ. Upon these principles that Socrates formed his beautiful fable when he says Pleasure and Pain were two sisters (though very unlike each other) who set out to [illegible] their fortune. The first was kindly received as a welcome guest by all men; and the second was on the contrary disliked by all. When Jupiter saw this he determined to unite them

and accordingly he bound them together by an indissoluble chain; each touch having different ways, as indicating their different natures; so that whoever should receive the one might have the other, for his guest likewise; and in this way they have continued to this present time.

CLIX. But in this particular there is a very great difference observed among the senses and the various pleasures which they produce. Some of them are very soon fatigued, and become incapable of perceiving those things for which they are designed as if they are perceived instead of giving pleasure which they generally do they excite pain; others are not so soon worn out but continue for a long time to discharge their office with additional gratification. Thus the senses of taste and smell are soon satiated, hearing can be employed for a longer time; and the sense of sight continues the longest of any without being fatigued. But the pleasures which

152 It is by the force of habit that we are
taught to relish and enjoy many things
which at first are very disagreeable. Upon
this principle all acquired tastes are found-
ed: and also the different ways of chewing
tobacco: & other articles of the kind.

which arise from the intimate senses are of the longest duration of any. For by varying & continuing such of these as are pleasures with those which are not, they can be continued with great satisfaction for a long time.

CLX. Besides what we have already related there are other things which have a great influence over some of the pleasures arising from sense: among these we may mention the various conditions of the body; particularly those of the nerves; and some of its organs and functions which are intimately connected with the organs of some of the senses, and perhaps with the senses themselves. And it is from this circumstance that some of those pleasures which are most certainly produced often cannot be always enjoyed. Thus to a thirsty person pure water is very agreeable as we see: and all kinds of food even the very plainest is pleasant to a person that is hungry; as gives pleasure to those who are not in want

and

used in the same very manner as satisfying to those who are old. But to the same man these things at another time not only cease to give pleasure; but become very disagreeable. Thus the most delicious meat and drink cannot be relished immediately after the person has done eating and drinking; nor can perpetual eating of one meal before another is digested give pleasure even to a glutton. Even the most sanguine votaries of Venus may be satisfied with her pleasures, so that they cannot relish a repetition of them for some time.

CLXI. But the exercising of the senses may produce pleasure as arising from a different cause besides that arising from the exercise simply (151, 152.) viz. from the action of the muscles. For while these continue strong, active and easily moved and not so long continued as to be fatiguing there will be pleasure in the using of them: but upon the other hand, when the muscles

of

of the organs of sense are mechanical, acted on or moved with difficulty the using of the senses will be painful. And for the same reason the various states of the mind, our desire, the exercising of the memory imagination or judgment will at one time give pleasure and at another pain.

CLXII. From all these it is evident that nature has bountifully supplied men with so many sources of pleasure, that she has not only enabled him to live: but has also contrived it that he shall reap enjoyment from living.

CLXIII. Neither are these pleasures which arise from the exercise of the senses by any means useless. The gratification which they produce, incites us particularly in the season of youth to exercise those faculties: so that being strengthened by this means, we are enabled to acquire a knowledge of the most useful

CLXIV. And by the same means mankind chiefly while young are excited to exercise the different organs of motion; which by being thus exercised become strong and fit for the different purposes for which they are designed.

CLXV. These pleasures likewise become incitements to actions of greater importance; by which mankind are kept together in society, and by which the human race is propagated.

CLXVI. Lastly the pleasures which arise from a moderate exertion of the mental faculties incite us to call into action the most noble powers of the body and mind: which if allowed to remain idle are of little importance; but if excited are the means of the Divine powers of any we possess.

CLXVII. All the senses which we enjoy both external and internal are subject to various objects and blemishes; because we do of them

many

be had acute, too obtuse or altogether obliterated
or otherwise depraved. And to this we may
refer many of the affections of the nervous sys-
tem, and which deserve the attention
of medical men whether they be primary di-
seases or symptoms or disorders which are
present or about to happen. (24)

Chap. V.

Of Touch or feeling: and its disorders: and of pain, anxiety and itching.

CLXVIII. Of all the external senses that of touch is the simplest and most generally diffused; because it can be exercised wherever the nervous energy extends it: although it is in some places more acute than in others as in the skin chiefly of the finger points. In these places it is said to originate from the nervous papillæ which are inflated by the blood; and by that means rendered more acute as to the sense: but this is only a conjecture founded upon the known structure of the tongue where the sense of taste depends upon these papillæ: and the opinion is corroborated as the sense of touch is more delicate in the tongue than in any other organ of the body, as is known from observation.

CLXIX. By this sense we discover the nerv-

-vous

more qualities of external bodies are hardness, softness, roughness, smoothness, heat and cold, rest, motion, figure, distance and magnitude. It is seldom liable to be deceived or misled, because the bodies whose qualities or appearances are in contact with the organs of sense; and have no intervening medium by the alteration of which the sense can be either hurt or deceived.

CLXX. With regard to the blemishes to which the skin is liable. It is very seldom true even of any part. In certain places it may be naturally less from the cuticle being too thin at the teeth, or from it being distended or inflamed, or perhaps opposed to too much heat.

CLXXI. It is obvious that sense may be wholly destroyed or entirely abolished through the whole body or in one part of it; by any defect in the brain or nervous energy, from compression, wounds or any deficiency in the vital powers, and

those

those affections are called Anæsthesia (loss of feeling) paralysis and sometimes Coma.

CLXXII. The sense may also fail in one part by its nerves being hurt by compression obstruction or wounds &c. or by the part being exposed to intense cold. It may also be effaced from a vitiated state of the cuticle by it's being too thick or hardened by frequently touching rough or hard bodies as is the case with the hands of glaziers and blacksmiths in some instances. The sense of touch may also be obliterated by the skin being elevated from an effusion of blood or serum under it: or the skin may be too much softened so as to become relaxed or torpid as sometimes happens in dropsical people. Or lastly the whole part may be destroyed from gangrene, burning, or intense cold or by being incised.

CLXXIII. The sense of Touch however is seldom totally deprived unless during delirium when all the functions of the brain are obliterated.

ated

CLXXIV. In the same manner as pain the exercise of the other senses pleasure or pain may result from the exercise of the Touch. Thus any thing that is smooth soft or moderately warm is pleasant to the touch, & we may refer the gratification we feel from slightly tickling or tickling to this sense, although these often proceed from internal causes.

CLXXV. The feeling of pain and other uneasy sensations as anxiety or sickness tickling are also referred to this sense; though pain may arise from the severe exertion of any of the other senses.

CLXXVI. Pain is that disagreeable and keen sensation which we generally refer to one part of the body; and it will be more or less acute as it proceeds from an internal or external part the latter being most severe. But the cause of the pain is not always seated in the painful part. It proceeds from some violence affecting a sensible part whether that violence be from without

without a pain in them. Hence whatever punctures cuts, tears or threatens, compresses, bruises or bites, likewise whatever corrodes, burns or in any way stimulates the part produces pain.

CLXXVII. Pain these circumstances that it is frequently concomitant in many diseases, and often more intolerable than the disease itself. Also pain in one part if long continued may produce it in the whole body; it also increases the flow of blood and nervous energy to the part affected; and in this way becomes a salutary though unpleasant excitement to motion which is both salutary and necessary. It is from this that pain has been by some ranked among the preservatives of life.

CLXXVIII. Intense pain however produces too great irritation, and of course inflammation and its consequences: fevers and all the evils resulting from a too rapid motion of the fluids. It also deranges the whole nervous energy and

occasions

occasions, watchfulness, convulsions, delirium, debility and the morning.

CLXXIX. Neither the mind nor the body are able to bear the extreme pain; and hence it has set limits to that which it cannot support; for upon its becoming too intense, delirium ensues and fainting, or even death itself; at least relieves the miserable sufferer.

CLXXX. Pain long continued though not severe often produces debility, torpor, paralysis, stupidity in the part affected.

CLXXXI. The ability to bear pain depends much upon the strength of the patient's mind, and the better he bears it the easier will those ills be which result from it. For in this as in every other instance the person is always lightest to the strong mind.

CLXXXII. Immoderate degree of pain if it be not accompanied with fever or anxiety is said to clear up and sharpen the mental powers in some instances. And we have an instance

of

of this in patients labouring under the gout who have confessed they were sensible of this.

CLXXXIII. From the perception of pain men have formed some idea of the manner in which its cause operates, as from its pricking, shooting, tearing or burning &c. the operation of the causes of which are known; they have hence some similarity between those and others which are more obscure.

CLXXXIV. Another of the uneasy sensations is anxiety which is evidently different from pain in its being more dull and less accurately referred to one particular part of the body; it is also often more intolerable than pain. We ought to observe that there is a very great difference between anxiety when used in a medical sense and the same term when used in common language. In this last acceptation it denotes a mental affection and has no connection with the state of the body; but proceeds from the fear of

of some danger or approaching evil. But in a medical term it is strictly confined, although it differs from pain in not having its origin from any particular state of the body: it may however happen that both these states may strictly may be present at the same time, the one may be the cause of the other. For indeed great bodily anxiety will produce great anxiety in the strictest mind; and the latter, especially if long continued, will hurt the strength of the body by deranging the circulation of the blood and thereby produce the former.

CLXXXV. Anxiety in a medical signification is produced chiefly by any cause that disturbs or retards the circulation of the blood in the cavities of the heart and Lungs. Hence we find it accompanied with some affect about the heart or its vessels, from their being enlarged contracted or ossified, likewise it is a symptome of prolapsus or palpitation, fainting or inflammation

mation or debility; since it is also an accompaniment of some of the affections of the mind.

CLXXXVI. This affection is also produced by difficulty of breathing, or whatever occasions it; because by it the passage of the blood through the lungs is impeded. And Anxiety of this kind appears to proceed from the bottom of the breast.

CLXXXVII. It is also said to be occasioned by whatever impedes the passage of the blood through the liver or other abdominal viscera.

CLXXXVIII. The most common kind of anxiety is that which is known by the name of Hypochondriasis and it is of all others the most oppressive. It is occasioned by any disorder of the stomach and intestines, either from their being loaded with a great quantity of faces or distended with air from digestion being impeded. Such an overloading or distending of so very delicate an organ as the stomach must be productive of bad consequences and hence we need not be surprised that it is attended with uneasy sensa-

sensations. Besides when the intestines are too much distended they impede the motion of the diaphragm and in this way occasion difficult respiration. Anxiety of this sort is very readily relieved by an expulsion of wind and when this with other circumstances forms a symptom of some disease in the digestive faculty. But in this species of it we can seldom relieve the sensation accurately to the bowels.

CLXXXIX. More or less anxiety is also a concomitant of all sorts of fevers and proceeds both from the general debility, and also from the blood being repelled from the surface of the body into the large vessels about the heart as upon the approach of an intermittant: and likewise from the disordered state of the bowels by their being loaded with a quantity of crude and corrupted aliment; and from their being distended with too much warm drink which will also produce nausea. During a fever the agitation and anxiety encreasing more and more; as medical men observe the same thing before a

a crisis, or the night preceding it. Before any cutaneous eruption or hæmorrhagy, or before perspiration or diarrhœa: either of which is sometimes observed to break the fever. The patient will also be sensible of an increased anxiety upon the repulsion of any eruption or privious to any salutary change.

CXC. But in fevers and many other disorders anxiety appears as a symptom of the failing of the vitale powers and of the approach of death which it always precedes. It also appears when the vitale powers cease to perform the injunctions as when the circulation of the blood begins to fail. But in these cases the other symptoms of approaching dissolution shew the kind of anxiety which happens in these cases.

CXCI. It is from the same principle that anxiety occurs during our sleep and hence the terrific dreams which sometimes break our sleep all of a sudden

CXCII. Itching is that uneasiness with a desire

188. Anxiety may also arise from any thing which disorders the nervous energy particularly that of the stomach: hence we find a degree of anxiety always succeeds excesses in drinking, even when the stomach is not so much disordered as to loath the food.

of scratching ourselves which is often very distressing though more allied to the sensation of pleasure than pain.

CXCIII. As pain proceeds from severe irritation whether chemical or mechanical; so itching proceeds from slight irritation. In this way tickling or friction with soft wool or any substance to which the body has not been accustomed: or touching the skin softly will induce itching; and the same thing occurs from the application of any acrid substances whether fossile, vegetable or animal. Hence when cantharides being applied to the skin they at first excite itching but upon being longer continued produce pain.

CXCIV The same effect is produced by some contagions of certain diseases as in small pox measles or the lungs evil: and also in some diseases of the skin as the scabb or leprosy, and others.

CXCV. The existance of some sort of vermine will also occasion the sensation of itching as will occur in lice or ascarides in the Rectum.

CXCVI. There are also some species of internal itching

itching which excite new heat & health and sickness to any necessary exertions; such as those which precede the voiding of urine, stool, nose coughing, sneezing &c.

Chap VI.

Of the sense of Taste its uses and properties, and the disorders to which it is subject.

CXCVII. The principle organ of this sense is the tongue and it is most acute near the point, & it grows gradually blunter the farther back it goes; although it ought to be observed that there are some substances which have little taste when applied to the point of the tongue, but we become more sensible of it the farther back they are applied and in the throat they excite a very acute sensation.

CXCVIII. The tongue is covered with a number of remarkably beautiful nervous papilla which are considered as the true seat of taste. And these are raised while tasting any thing and the more they are erected the sensation of taste is the keener.

CXCIX. Nothing can be tasted till part of it be dissolved in the saliva (which is a pure watery liquid) for the substance must be

applied

applies in a fluid form so that it may insinuate itself into the interstices of the Tongue more completely and affect the nervous pulp. Hence the insoluble earths have no taste.

CC But it is not sufficient that a body be soluble to render it obvious to the sense of taste it must likewise possess something saline or acrid that it may stimulate the nervous energy: Hence whatever is less saline than the saliva will have no taste.

CCI The sense of taste is divided into various genera although some of these cannot be very accurately distinguished. They are termed acid, sweet, bitter, salt, insipid, aromatic and putrid; but some of these cannot be discovered without the aid of smell. Each of these different tastes, have different degrees of strength: and may also be combined together so as to produce a great variety.

CCII Of tastes we find some of them very sweet

and

and agreeable, others so very unpleasant that they can hardly be endured. In this respect, likewise there is a very great difference in different men; for a taste which to One will be very agreeable, to another will be highly unpleasant.

CCIII. It is also observed that the most delicious tastes if continued for a long time, are apt to become soonest disagreeable; whilst the most unpleasant as that of Tobacco, Opium and the like, will by custom become very agreeable.

CCIV. In order, taste seems to be designed to make us to select what food is wholesome and improving for us, and to avoid what is hurtful. So in general if the taste is sound good food is agreeable to it and what is bad is on the contrary unpleasant. And it is by this great instinct especially when assisted by smell that the brute creation are able to choose what food is proper and to avoid what is pernicious.

ous

ous, and in this respect they are deficient.

CCV. Instinct however in this respect as well as in others is not as perfect in man as in beasts; because man being endowed with other faculties does not appear to stand so much in want of it; and besides in this particular it is not infallible in man because the taste in him is often vitiated by his manner of living.

CCVI. In this case too we see the bounty of Providence clearly displayed; for even the taking of nourishment an action so necessary for life is accompanied with pleasure. For we are induced to take food from the agreeable sensation which its taste produces when it is wholesome. But it ought to be observed that this gratification depends in a great measure upon the state of the bowels and the necessity the person has for food; for if a man be hungry he will take with

with pleasure food, the plainest and most
common quality; and the most delicious meat
will not be relished if he be not in want of
it. Besides during mastication the saliva flows
more copiously, by which means the taste is
made more acute, and hence the food more gra-
tifying. When a person is hungary the saliva
is secreted more plentifully upon the sight
or even when he thinks of a delicious repast.

CCVII. The sense of Taste is rarely to be acute
unless there be some defect in the cuticle of the
tongue; and if it be removed or wounded or
ulcerated with aphthae or the like, the taste
becomes too keen and also painful in the
exercising it; so that in some cases there is
no taste distinguishable for the sense of pain.

CCVIII. In some cases this sense fails in the
same way as touch viz from some imperfec-
tion of the Brain or Nerves; but examples of
this are very uncommon. There are also some
men who have this sense naturally imper-
fect; and in these the absence of defect in the

more

smell likewise. The taste may also fail from a deficiency of saliva, for the tongue when dry cannot be sensible of taste. Hence it is defective in many diseases chiefly fevers or colds and this may happen both from a deficiency of saliva, and from the want of appetite; & both these are necessary in a healthy man for his exercising the sense of taste; or lastly it may fail from the tongue being furnished up with mucus.

(4) The sense of taste may also be vitiated in other two ways, viz. when the substances applied to the tongue produce no taste at all; or perhaps the taste felt may be different from that which the same substance used to produce. This proceeds from a vitiated state of the saliva which in this instance is what we taste and not the substance. In these cases we feel every thing taste sweet, salt, sharp, bitter, putrid or rancid according as the saliva is in either of these states. And this alteration in the saliva may be occasioned by the general state of the humours or by

or by some defect in the organs which secrete it, or it may proceed from the state of the mouth or bowels; or from putrid exhalations from corrupted substances lying in the stomach.

CCX. That the taste may be vitiated from other causes besides that of the saliva; and from an imperfection in the nervous papillæ the structure of which we are but little acquainted with. And this is the more evident because we find the taste defective in some cases where the saliva has no imperfection in any other person.

CCXI. The condition of the tongue has been generally attended to by physicians in many diseases particularly in fevers; and from it they can not only judge of the state of the bowels, but they can likewise know if the patient requires drink when he himself from delirium or stupor is not sensible of being in want of it, or perhaps is unable to ask for it. By inspecting the tongue they are also sensible of any increase or remission of the disease.

Thirst

Chap. VII

Of the sense of smell its uses, marvelous effects. also of the nature of odours and their operations upon the human body.

CCXII. The seat of this sense is in those very delicate and tender membrane of nerves and blood vessels which lines the internal cavities and passages of the nose and the processes of the os. It is most acute about the protuberance between the nostrils and the bones of the nose because in these places the membrane is thicker and softer ~~in these places~~ than it is in the deeper cavities where it is thinner and less moveable and less sensible; although it is observed that these parts likewise possess the power of smelling in a certain degree.

CCXIII. As we attribute the sense of taste to the solid particles of bodies, so we ascribe the sense of smell to the volatile parts of them which float in the air we breath. For we smell any body better when the mouth is shut and the nostrils dilated because in this case a greater quantity of the volatile

volatile particles is applied to the organ of smelling.

CXIV. The organ of smell also resembles that of taste in this particular that it requires to be moistened to a certain degree before it be capable of discharging its duty with accuracy; and this is done partly by the tears which are distilled from the eyes and partly by its own proper mucus.

CXV. As the taste is placed in the passage of the food so the sense of smell may be considered as the door of that passage; and it ought to be sensible to the air we breath. It is placed before as a guard, least any thing hurtful should be admitted into the body. Besides the sense of smell acting with that of taste enables us to select such food as is wholesome and avoid what is hurtful particularly such as are putrid or in a state of acrimony.

CCXVI. The effect of some odours upon the nervous system is sometimes very powerful and truly astonishing. Some of them are very grateful and restore the vitale principle when almost extinguished; others again are mortified and if

applied

applied to some ones will entirely extinguish it. It is upon this principle that antipathies against certain substances are founded in some men; and although these are very odd notions it is impossible to remove them in many cases.

CCXVII. The sense of smell is sometimes too acute and this may happen through a rarity in some particular affection of the organ or from too great sensibility of the nervous system as is the case in some fevers, or the inflammation of the brain or in hysterics.

CCXVIII. The sense of smell may be blunted by any violence being done to the ~~head~~ nerves or brain, as from blows upon the head or from any internal cause; or it may be hurt by some effect in the organ itself, as from its being too dry by the usual humours being dissipated or diverted into some other channel; or the organ may be too moist from the tears or mucus being too copiously secreted. To both these we have examples in the

the course of a common cold; for in the beginning
of it the nose is dry but afterwards it becomes too
moist and filled up with thick mucus In this
case and other examples the object proceeds
from the membrane being too much relaxed by
inflammation, in either of which cases its tension
must be affected. Besides the smell will be hin-
der'd by whatever destructs the passage of the air
to the nostrils for if it be not admitted there
can be no smell.

CCXIX. Sometimes we find the smell vitiated so
that odours are perceived where there is no odo-
riferous body; or perhaps the smell of bodies
which is perceived may be different from what
it ought to be as generally is. This may hap-
pen in perfect health from odoriferous particles
being lodged in the cavities, and breaking out
so as to affect the membrane. Or it may pro-
ceed from some disease in the nose as parts
adjoining, as ulcers, caries, cancer, or some
corrupted state of the mouth, teeth or lungs
or even from undigested food lying in the
stomach

stomach or bowels and exhaling fetid vapours
This sense may likewise be vitiated from some
imperfect state of the brain or nerves, but this
is not so easily ascertained per se.

Chap. VIII.

Of the Sense of Hearing. The nature of Sound. Defects of this Sense. Of the Ringing of the Ears. (Tinnitus Aurium)

CCXX. This sensation is produced by the tremors of the air which proceed from sounding bodies. These are collected by the external cartilage and duct of passage of the ear and by them conveyed into the drum, to the membrane of which they are applied with considerable force this membrane being set in motion moves a small bone termed the Malleus which is affixed to it; and this bone by the aid of its own proper muscles strikes another called the Anvil. Which in it communicates the motion to other two called the orbicular and Stirrup or this by its muscles is drawn towards the foot called the oval opening which leads into the inner cavity of the ear. Besides these the tremors of the air are conveyed to the membrane of the drum through the passage called the Eustachian tube; and by means of the membrane of the round opening by which means it reaches the

the inner passage of the ear. Thus we see the undulations of the air are admitted by two ways into the labyrinth or inner part of the ear, the whole of which is lined with an extremely sensible nervous membrane, and filled with a gelatinous watery fluid exceedingly well adapted for receiving and propagating all the vibrations and undulations to the principal part of the organ of hearing.

CCXXI. The most learned are not agreed what we know very little about the action of the internal parts of the ear except that of the semicircular canals admirably adapted for receiving and conveying the tremors of the air and hence for the purpose of hearing. But we find that sounds may be propagated through the teeth, jaw bones and larynx so as directly to affect the immediate parts of the organ, and by this means one who is almost deaf can hear by the mediation of any substance the pleasures of music in a certain degree. Hence we see that this subject is still involved in obscurity and that the use of many parts of the ear is not

216 Some antipathies are formed from the sense of sight; hence the unpleasant sensation which many feel when a disagreeable object is presented to their view, even when there is no smell perceptible, or when the smell of the object would not affect them if concealed from their view. This is illustrated in the case of the horse fell at the sight of a serpent or reptile even after it is dead; or when one sees a severe wound and the bare sight of blood will occasion the same thing in many people unaccustomed to such scenes.

218. It is also found that the nerves of the nose may be affected so as to injure the sense of smell by a too frequent stimulus being applied to them as by the action of narcotics and is exemplified in those who take snuff whose sense of smell is frequently blunted or destroyed.

CCXXII. Sounds are divided into strong and weak, grave and acute. The strength and sharpness of a sound depends upon the strength of the vibrations which the sounding body communicates to the air. And the gravenes upon the number of these vibrations which are performed in a given time. But both of these there are certain limits assigned beyond which none do sound, or if there be any it is very acute and unpleasant to the ear that it can hardly be heard.

CCXXIII. Besides sounds may be conveyed by reverberation from different bodies which receive the tremors of the air and return them again either in the same or a different direction; sounds thus reflected are always in unison with the first sound from which they proceed; and if they strike the ear at the same time with it they make it stronger. Hence the voice is louder in a close room than in the open air. When sounds are reverberated

fed

led from a distance so that they are heard after the first sound is gone, it forms what is called an Echo.

CCXXIV. There is an immense variety of sounds because the smallest change or combination of them can be distinguished by a good ear. The effects of them are also very astonishing upon the human mind and of course will be different to different persons. They chiefly affect the mind with joy or sadness and it is from these principles that mankind derive the source of their finest gratifications. But all men are not possessed of what is called a musical ear although we cannot give a reason for this; as it does not depend upon any deficiency or acuteness of hearing: for we find half deaf people who are excellent judges of music, and others who hear perfectly well cannot relish its sweets. Neither is there any reason for our imputing this to any inequality of hearing between the ears. This faculty is the gift of nature and cannot be acquired by any study, although like the other faculties of man it

it may be made more perfect by being cultivated.

CCXXV. The sense of hearing is of all the most liable to be vitiated; and this is not to be wondered at if we reflect how delicate and complicated the organ of it is.

CCXXVI. Deafness becomes incurable from a general irritability of the system as in the case in women of a hysterical constitution or while living in chronic: or this may happen from an increased irritability of the brain or the mind in some fevers or inflammation of that organ as in some cases of insanity: or it may proceed from local affection of the ear by its being affected with inflammation, paralysis or dissolution of its membranes.

CCXXVII. It is evident that sense may become blunted or altogether defective so that the patient hears but indistinctly or perhaps not at all; and either of these affections may proceed from the various causes applied with different degrees of violence. Thus it may be occasioned by some affection of the external ear or its passage as by the morbid

dense

some vitiated state of the nutrient fluid which may be rendered imperfect by an injury with regard to it's quantity, as it may become concreted from suppuration as occurs at times after the small-pox. A defect of hearing may also proceed from the membrane of the Drum becoming too rigid, ossified, and ruptured: or from a deficiency of the Drum itself, or an obstruction of the Eustachian tube. The same will happen if there be any malaffection of the small bones or the membranes, or if the muscles of the labyrinth be affected with convulsion, spasm, paralysis or torpidity. And lastly any disordered state of the brain or nerves will affect the hearing if the organ should be perfectly sound. Hence we find deafness as a nervous disorder affecting suddenly and going off spontaneously again, and hence it is a common disease in old men whose parts become rigid and therefore less sensible.

CCXXVIII. In persons particularly such as are accompanied with debility or weakness, deaf-

ness

ness often becomes a symptom: and this when accompanied with other indications of oppression in the brain and prostration of strength certainly ought to be considered as a bad one. But on the contrary it is often deemed a good omen even if accompanied with sleepiness: although in general there is a reason for this.

CCXXIX. The sense of hearing may also be depraved in another way viz. the person hears sounds as that of a drum, a bell, or like the falling of water when there is no vibrations in the air and when a person in health hears nothing. This affection is what is termed a ringing of the ears of which there are various kinds. In some cases it is slight and of short duration; but in others it is loud and continued and very molesting in the night time.

CCXXX. In some instances this proceeds from irritating causes in the external passage or obstructions there being partially obstructed so as to prevent the free passage of the air upon which account it makes the membrane of

of the Drum and internal parts of the belly, with unequality. Hence that species of ringing of the ears called Bombus which is perceived [illegible] when the patient

CCXXXI. That there is another distressing species of ringing of the ears, which accompanies many of the febrile and nervous diseases, and proceeds partly from an increased flow of blood towards the head and encreased sensibility of the nervous energy so that the heart of the patient is heard and partly from an increased sensibility of the nerves and muscles of the labyrinth of the ear; from which it happens that those parts which only ought to sound when excited by the vibrations of the air get into motion spontaneously and communicate it to other parts.

CCXXXII. Ringing of the ears proceeds in some cases from violent affections of the mind as from a disordered state of the bowels; as from a Rheumatism of the back and dear

or

or from cold which affects the constitution in the
same manner the singing in the ears and
deafness this is a very troublesome disorder.
CCXXXIII This however as well as many disorders
of this sense may proceed from various causes
which are not easily understood. and this hap-
pens both from the concealed situation of the
organ; and also from our being ignorant of
the action of many of its parts; and hence it
happens that many of the disorders incident
to this sense are very difficult to cure.

Chap IX.

Of the sense of sight — its defects, and beauties.

CCXXXIV. The rays of light paping from every point of any shining or illuminated body which we behold, fall either directly or by reflection upon the anterior coat of the cornea of the eye; some of them indeed obliquely are either reflected off or absorbed by the black pigment which lines the back part of the ciliary processes as it is and never reach the interior of the eye. But such rays as fall directly upon the cornea pass through that pellucid membrane and the aqueous humour lying below it to the crystaline lens which they reach somewhat refracted. By the power of this lens and the vitreous humour which is placed behind it, they are still more refracted and collected into a point or focus which depicts a most beautiful but inverted image of the body from which on the retina or bottom of the eye, from whence it propes to the mind and constitutes the sense of seeing

See Willich's Lectures on Diet p 627.

228. As a preternatural rigidity or dryness of the ear may produce a defect in the hearing: so the same thing may proceed from a too great softness of the ear or its parts: hence young infants hear imperfectly; and we sometimes find young people dont hear perfectly until they attain their growth and the body becomes of a proper firmness.

229. Perhaps the deafness which is deemed a favourable symptom may proceed from some diminution in the nervous action owing to a depletion in the brain; which is always attended with less danger than an encreased action or over excitement in that organ. And this conjecture appears to be strengthened from the fact that an encreased flow of blood towards the head or inflammation in whatever excites the action of the brain renders the hearing more acute.

CCXXXV. This very delicate nervous membrane called the retina is the principal organ of vision and upon the inverted image depicted upon it a man whose brain and optic nerve is in a sound state sees the object erect, distinct and in its proper colours.

CCXXXVI. The eye is composed of several different humours although one of them might be sufficient to refract the rays and collect them into a point so as to depict the picture upon the retina, for we find this can be done with a single lens, but by means of the different humours the various colours which arise from an inequality of the refraction of the rays is guarded against and by this means an object is seen with accuracy and in its proper colours. For we know by experiment that a lens formed in a particular way possesses the power of refracting all the rays equally much more than the common lenses do. And perhaps the different density which we find in different parts of the

the humours may contribute to this: for the refractive powers of these parts may be equal to the difference of refrangibility among the rays of light.

CCXXXVII. The retina (in which the greatest part of the eye is composed) is by no means the most useful substance in it: for if the globe of the eye is formed and the retina kept distended so as to represent a portion of a hollow spherical surface by which means a greater number of points of the body viewed is depicted upon upon it; for it is obvious if the bottom of the eye was a plane or any other figure but that of a sphere there would be only one point of the retina upon which the image could be formed on account of its distance from the centre of the eye, and hence there would be distinct vision only in that point which would be the centre. And if the rays should fall upon any other point they would be either too little refracted or diverging again after having been collected into a fo-

-cus

did they would produce an indistinct and confused image so that vision would be very imperfect

CCXXXVIII. The eye is of a spherical form on purpose that the rays which pass through it may be form'd into a focus before they reach the retina. And it is for the same reason that the cornea is convex and prominent; for we find in those animals whose eyes are smallest the cornea is always most prominent. The roundness of the eye is also of service for it moving easily and with rapidity in all directions.

CCXXXIX. There is an astonishing consent or communion observable between the eyes and also between different parts of them. Thus the one eye is always observed to turn spontaneously in the same direction as the other, for this reason that the eyes of both may be directed to the same point of the body which is contemplated; and by this means the image of it is depicted on the centre of each retina because in that part vision is most perfect.

CCXL. The pupil of the eye is dilated in the

dark

dark, but when brought into the light, or if the light is made more vivid it immediately contracts, and this depends upon some connection between the muscle which contracts and dilates the pupil, and the retina; and does not depend upon the irritability of that muscle. For we find in cases where that muscle is perfectly sound if vision is lost there is no contraction or enlargement takes place. There is likewise a sympathy between the two muscles in the two eyes, for upon the admission of light to one of the eyes the pupils of both of them contract.

CCXLI. The pupils are also observed to contract if we contemplate any object steadily at a short distance from the eye; and this takes place on purpose that the superfluous and most oblique rays which the eye cannot converge into a focus may be excluded. And it is for the same reason that pupils in infancy are so much dilated, and in old age when the eyes turn flat they are generally contracted. It is not

yet

yet known with certainty in what way the eye accommodates itself to our different distances: the Ciliary processes seem to be for this purpose, and that they by moving the christaline Lens from its usual place can draw it farther from the Retina so that the rays may be more inverted before they reach it. But are certain (whether it be by the muscles of the pupil or by the ciliary processes, or by the help of other parts not yet discovered) the eye can accommodate itself to the viewing of objects at any different distances within certain limits.

CCXLII. It was a question long disputed among Physiologists, Mathematicians and Metaphysicians how it could happen that, from an inverted & image painted upon the Retinae of the eye we should see objects erect; and likewise that when there are two images viz. one in each eye we should see only one object.

CCXLIII. The resolution of these questions is a matter

a matter of little importance to the Physician although many very eminent men have employed their talents for that end. It may however be of considerable importance to know that it is a simple and immutable law of Nature that every visible point of any object shall be seen in the direction of a straight line drawn from the ~~Retina~~ point in the retina upon which the image is formed and passing through the centre of the eye. And although there have been no experiments or arguments adduced to prove this to be the direction with mathematical accuracy, yet there has not been the least error detected in it. Hence we may infer from such experiments as have been made that every visible point of any object which we contemplate will be in this direction or very nearly so. And therefore according to the known laws of vision, the eye is so formed that if the image were erect the object would be inverted; and for

or the same would not have the image placed
from an erect object.

CCXLIV. Neither is it true that objects are seen most distinctly at first glance; or that an object is always seen in the true direction and position in which it is or in the direction in which the rays of light fall upon the cornea or retina; for we can by experiments easily show an object visible in the place where it is not, or in more places than one at the same time. For the rays of light passing in a diverging direction from any point of an object, as soon as they fall upon the eye are refracted into so many different ways by the various humours that is vision depended upon this we should always see an object in more than one place at a time and it would in all cases be confused and indistinct.

CCXLV. The question concerning the single vision from the two images was at first inaccurately explained but was afterwards illustrated more distinctly: and it is found that vision is not always single if the soundest men will be either single or double according as the eyes are turned to-

wards

wards the object contemplated we perceive them
to be so. If the axes of both eyes are turned to
the same point of the object, there will be an im-
age of that point upon each retina and the
vision will be single. Besides however many
objects are placed at an equal distance from
the eyes and upon each side of that point will
also be seen single; because the images of each
of these objects are painted upon each retina in
a similar position with respect to the centre of the
Retina. Therefore the centres of the two retinas &
the points in each which are similarly situated
with respect to the two centres whether above or
below, on the right or left side of them are said
to coincide and will produce a single vision from
the two images of any body painted upon them.
But when the objects viewed are placed nearer
or farther from the eyes than the point in which
their axes meet they cannot be seen single but
will produce a double vision. For it could be
easily shown that the points of the Retinas
upon which the images of objects so placed are
painted

points cannot be situated similarly in both eyes with respect to the centres of the Retinas; and the images will be found in the left of the one eye and in the right of the other. Hence those points of the retinas which are not similarly situated with respect to their centres will not coincide; or in other words will produce a double vision of the same object as there are two images.

CCXLVI. There is a species of defect in the sight which we often meet with, but which can hardly be called a disease. Those affected with it are called Myopes or near sighted people because they cannot see any object distinctly, unless it be held very near to the eyes. This proceeds from the rays of light being too much converged so as to be brought to a focus before they reach the Retina; and beginning to diverge again they depict an indistinct image upon it. The cause of this defect is most frequently a too great convexity of the whole eye or of some

sance of its humours or too great a prominency of the cornea or by which means the rays in passing through the eye are too much refracted. It is a common occurrance in young people, and in some cases it is said to go off as they become old, but this does not always happen. If a slight degree be observed early it may be remedied by accustoming the eyes to look at objects at a distance, and keep them from examining objects near them, in the same way as the contrary practice is apt to induce the disease; because the eyes in a certain measure accommodate themselves to the distance of objects they are in the habit of looking at (241) But the most simple and best remedy is, the concave Lens which makes the rays diverge before they fall upon the eye.

CXLVII. Presbyopes or long sighted people are those who cannot see any object correctly unless at a distance from the eye. This defect is exactly contrary to the former, and proceeds from

upon an opposite cause; chiefly from the eye be-
ing too short or that it is not round enough
to refract the rays sufficiently. Hence we find it
to be their peculiar common to those who in
youth have seen perfectly well, and the using
the convex glass is the best remedy for it.

CCXLVIII. Myopes are such as see best in
the night time, or who can distinguish objects
with a faint light better than when it is bright.
This is a very uncommon disorder among
men; and proceeds either from the retina's be-
ing too sensible, or from the pupil being too
large, or not possessed of a sufficient contractile
power. Men in health are subject to this dis-
ease, who after being long confined in a dark
place, are suddenly brought into the light;
but in them it is only to a slight degree &
soon passes off.

CCXLIX. The whole of the inner surface of the
eye is covered with a black pigment a continu-
ation of the choroid coat and ciliary ligament,
the

the use of which is that they eye may be the more completely a camera obscura and the image depicted upon the Retina the more perfectly and distinct not being confused with unperfected rays. It is said that there is an unhappy race of men (known by the name of albinos) in whom the choroid coat is of a red colour like that of a white rabbit. Men of this description will have vision always imperfect but they will see best in the night time.

CCL. Such animals as catch their prey by night as the cat the owl &c have the choroid coat red that it may reflect such of the rays as are most offended. But in these vision is thought to be very imperfect even in the night time unless what is sufficient to enable them to catch their prey: of this however we cannot get certaine. In these animals the pupil is very movable, and appears at times only like a small dot hardly visible, but it is capable of being dilated into a large circle as the light diminishes. they have the retina also very

very sensible sense of those like the whole. Thi
animals scarcely see any during the sun shine;
but it is doubtful if this effect be equally great
in all of them. We are not certain that by
the very close contraction of the pupil, it is so
managed that what little light is admitted
into the eye only falls upon the centre of it:
for as we know if the light is immediately
reflected by the choroid coat, as if such reflection be
necessary. Neither are we certain whether or not
this reflecting power depends upon the influx
of the blood into the vascular membranes of
the animal may be able to regulate it to a
certain degree. The eyes of all animals as
well as of man himself are affected by the
motion of the blood, or passions of the mind;
for when the circulation becomes languid
the eyes turn dull, and when it ceases their
splendor is entirely lost.

CCLI. The sense of sight is liable to many very
serious defects. It may be that from a time it is
that the patient either cannot see any object at
distinctly

distinctly; or he cannot look at any thing for the intense pain which it gives him: the first affection like that of the other senses may proceed a the irritable state of the body, or from some particular state of the brain as in the case in phrenitis and other febrile diseases, or from inflammation of the brain or its membranes. But the defect of vision most frequently proceeds from some improper state of the eye itself so that it cannot bear the light. As from inflammation of the fore part of the tunica adnata or sclerotica which sometimes extends backwards to the choroid or retina itself. Hence the inability to bear the light, the pain and great irritation inducing Delirium or increasing it if present.

CCLII. Vision may be clouded or altogether obliterated by age alone; as in cases where the eye becomes too full from a deficiency of the aqueous humour or from the cornea, lens and vitreous humour becoming more

or

of sight the Cornea becoming dry and opaque with it would happen from the motion of the blood being too languid, and the vessels ceasing to be long shut up. Or vision will be impaired by the lens becoming yellow like amber or by the retinas turning less sensible; for the age diminishes the sensibility of every part.

CCLIII. Sight is sometimes entirely obliterated when the brain or optic nerve being hurt although the structure of the organ be perfectly safe. This takes place in the disease called Amaurosis and in gutta serena when the pupil continues dilated and immovable although the humours are perfectly pellucid and distinct; and it is generally ascribed to some compression or stupor of the nerves from congestions of blood. When only a part of the retina is torpid we see black spots in every object we look at and the appearance of dust always floating before the eyes; and this is a frequent and general symptom in some fevers. —

CCLIV.

CCLIV. The sight is often initiated by some part of the eye through which the rays shall becoming shade, as in the case of such spots upon the cornea or the aqueous humour being mixed with blood or some other the lens becomes brown (as in cataract) or when the vitreous humour is initiated by any of these things. Or lastly all the humours of the eye may become confused or jumbled together by inflammation or suppuration, so that they either don't allow the rays of light to pass through them at all or they do it imperfectly. So are dissipated, dark, discoloured & imperfect images upon the retina; or perhaps none at all.

CCLV. It is unnecessary to explain the defects of vision which happen from inflammations, or a matter or suppuration of the eye lids or adjoining parts; for these cannot properly be termed defects of the sense, for about consists unless the light be admitted to the eye.

CCLVI Vision is sometimes depraved so that the patient sees objects of a different colour

from

Ltr. An instance of objectation is mention
ed in the life of the celebrated Baron Trenck who
after being confined in a dark dungeon could
see clearly when the light was not diffused
with & could see any other person & the
object.

200. It has been remarked that Electricians
as cats when they might especially the Fe
tube have coats which are very imperfect con
ductors of Electricity, and hence have conjectured
that by a certain motion in the muscles of the
body they agitate their fur so as to produce
an electric spark which presses on the
eyes and produces a sudden glowing light
so as to enable them to see better. If this be
the case the whiskers or antennae are
probably designed to assist in this electrical
operation: hence there may be some truth
in the popular idea that when a cat's whis
kers are cut off she can catch no mice.

from what they really are (or which happens more rarely) see them in a different figure or situation in a place where they are not. This proceeds from the humours being tinged of an unnatural colour as is said to happen sometimes in the jaundice, by which it is rendered) or from humours being mixed from ill proportions and being mingled with aqueous humours. There is an uncommon defect of this sense in those men who are perfectly healthy and perfectly well, and which is always observable in them viz. they cannot distinguish certain colours, as for instance the colour green always appears blue. Another defect is when men see upon the shimmering of flames of different colours when there are no such objects before their eyes. This last mentioned is a slight defect and of short duration. It proceeds from a too suitable habit of body so that the retina is capable of receiving too slight impulses; or such as arise from any unusual violence in the heat of the arte-

ries

but, or as when they perceive a luminous flame upon pressing the finger upon the eye with the eye-lids closed. Such as have been brought to life after having been strangled or wounded describe their having seen this kind of flames of light. It proceeds from a conjestion of blood in the brain by respiration being stopped which excites the action of the nerves in the head.
This kind of scintillations have also been observed in fevers, and in insanity & ferocious delirium and is accounted a bad omen; they likewise appear in some of the most serious disorders of the head as in paralysis, apoplexy and epilepsy. But it is a question whether or not spontaneous movements of the nervous fibres in the retina will occasion the perception of light where it is not

CCLVII. Against this argument from the perception of objects in places where they do not exist proceeds from some affect in the brain as in insanity or delirium; and not from any impression

from

imperfections of the eye.

CCLVIII. The most common of all blemishes in the sight is what is termed by medical men squinting or squinting. A person who squints has the axes of his eyes preternaturally oblique; and does not direct both to the same point, and hence he sees imperfectly and with uncertainty, sometimes double and often confused: and it is a great deformity to him. This defect is in general born with us, but it frequently happens from the efforts the infant makes to see any agreeable object before he is strong enough to look at it, and when the object is not held in the proper position. It is also easily acquired from imitation which all men but particularly children are fond of doing, and it is not easily left off when it is once acquired.

CCLIX. The cause of this great blemish is often in the muscles of the eyes; from these being ill formed or affected with paralysis, rigidity or contraction so that they cannot govern the eyes properly.

CCLX. It is sometimes induced by epilepsy in which all the muscles, but chiefly those of the eyes are gradually con-

convulsive; and during the fit the muscles may be distorted or lacerated or receive some other irreparable injury.

CCLXI. Strabismus sometimes accompanies disorder of the head chiefly hydrocephalus. A distortion of the eyes will also proceed in some cases from any great violence applied to the head; and in some very rare instances it appears suddenly without any known cause.

CCLXII. The distortion is sometimes in both eyes and sometimes only in one; and in some cases it is more in one than in another.

CCLXIII. It is very probable that distortion may proceed in some instances from a defect in the retina when the centres or the points adjacent to them do not coincide; there may be a distortion instead of a double vision. And this seems to be the reason why the squinting is greatest when contemplating any object near the eyes. The same will happen if the centres of one or both eyes be insensible for in this case the person must turn his eyes obliquely before he can see anything; and this takes place when the optic

of the nerve unless the eye opposite the centre of the
retina for if such was the state of all men they
would all squint or have a double vision.

CCLXIV. Medical men have agreed that every dis-
turbing sensation termed vertigo (giddiness) to be
a defect in vision, although it might rather be
considered as a defect of conception merely, for it
will occur in the dark as well as the eyes are shut.

CCLXV. Vertigo is that sensation in which we think
we see and feel ourselves and the objects near
us reeling, whirling round or moving in any
direction it is not the case. And if the vertigo
be to a great degree the patient cannot see any
thing for he feels something like a veil drawn over
his eyes; nor is he able to stand owing to a failure
in the power of his joints. This sensation is gen-
erally accompanied with sickness & the one
will induce the other.

CCLXVI. Vertigo is observed to be the companion
or forerunner of some of the most dangerous dis-
eases, as apoplexy, epilepsy, and hysteria; in
cases

causes of fulness of the body or suppression of the
menses it is also observed to precede hæmorrhagies from different places: likewise it occurs
in fevers accompanied with debility or with
an increased flow of blood to the head. Any vio-
lence applied to the head will induce vertigo but
that applied to the eyes will scarcely do this un-
less the whole brain be affected. Indolent and co-
pious evacuations of blood or other humours,
debility or syncope, likewise various disorders
of the intestines chiefly persons taken into them
and particularly such as are of the narcotic
kind as opium, wine, and all intoxicating li-
quors will produce vertigo: and hence it is
symptom of all sorts of inebriety. Different sorts
of motions to which the person has not been ac-
customed will produce the same effect; of these
we may mention a rotatory motion of the head
or whole body; the agitation of the sea, particu-
larly if the ship be small and the waves high.
In these there is an unusual motion of the
blood

blood produced in such a manner affects the nervous parts of the head; or they are affected from sympathy with other parts which occasion a confused or whirling perception of objects.

CCLXVII The same effect is produced in some cases from impressions upon the mind, as when we look at any object which deeply intimidates us, or stand upon a high precipice; and even without seeing such objects, in some instances thinking intently upon them will occasion vertigo.

CCLXVIII This disease is sometimes a concomitant symptom of others; and in some cases it leaves the principle disease; and when it returns at intervals it becomes gradually more severe, till at last it impedes and destroys all the action both of body and mind; and even the strongest and powerful judgment of sight is not found able to withstand its ravages.

(Chap

Chap. X.

Of the senses which are called internal — the memory, imagination, and judgement — their varieties and objects.

CCLXIX. Besides those powers and faculties already described man is possessed of others, which are called internal because they discharge their offices without the intervention of any external object, and the organs subservient to them are like internally and are inaccessible to any external object, so that they perform their duty by the powers inherent in themselves.

CCLXX. Perceptions excited by the application of external objects are fugitive and perishable in their nature and soon pass away: but if the same object be again applied to the organ, it not only renews the perception, but the person remembers the former sensation which it produced, that is to say he knows that he felt the same before.

CCLXXI. This is the first and most simple species of memory; and is what is seen in early life. So when an infant of six months old recognises

its parents are more but acquaintances.
We called the faculty of remembrance in the sake
of distinction and seems to be the first principle
of perfect memory.

CCLXXII But in some cases remembrance which
have long since passed away and have again or
sleep are renewed without any external object
being applied to the organs of sense, and often
without any obvious internal cause, even when
the person is not thinking or wishing to think
of them. Remembrances of this kind are more
nearly allied to perfect memory than the former.

CCLXXIII. Memory may be most truly defined
that power by which we can recall perceptions
long past in the same order in which they were
at first presented; and retain, contemplate or
commit them as we please.

CCLXXIV. In early life this cannot happen, but as
we grow up it comes on and increases. In old
age the memory is very acute, strong and tena
cious; in youth and manhood it is in its first

vigour

vigour, and as we advance in life it burns more feeble; and in old age becomes very weak & exceedingly alkalescent so that it readily loses any new impressions, but retains such ideas as it had received in its youth when it was most tenacious: in extreme old age however almost all memory both new and old are effaced from the memory.

CCLXXV. In some men it is far more acute and tenacious than it is in others: but in all it is much improved by cultivation and exercise, (if these are not pushed too far). As it varies in different men so it will vary in the same man at different times, being at one period less vivid or rapid than at another: so that at one period the images present themselves to the mind very slowly, and at another pass by with such rapidity that they can scarcely be contemplated or recognised. This keenness depends in a great measure upon the state of health the patient enjoys: and likewise upon the state of his mind whether occupied with important concerns or in a calm

and

and tranquil state so that he can attend with accuracy to his ideas. His habit of body whether it be acute or less sensible or irritable will also have its weight in this respect; and hence the motion of the blood is to be attended to, whether it be tumultuously quick as from vigorous health, fever or pain, or if it be slow as from torpidity, or sleepy &c. In young boys particularly such as are sprightly the memory is very ready, and this among other causes produces that instability and immaturity of judgment they have at this age.

CCLXXVI. The memory acts during sleep if it be not very deep; but at this time it is inaccurate in as much as it will not keep it's last images in their proper order as it does in a healthy person when he is awake.

CCLXXVII. The perceptions which make the strongest and most lasting impressions upon the memory are those which are strong, new and frequently repeated; likewise such as produce the sensation of pleasure or pain or affect the mind in any unusual

unusual way. The order & arrangement of things which we have once perceived is also very grateful to the memory, because it is by means of this or that we are enabled to recall any thing back to it. Memory is the fountain and origin of all kinds of science and judgment; and the chief part of these is their order or arrangement, for without this there would be no memory or art. Art it would be but vague and useless, such as occurs in people asleep or in a delirium.

CCLXXVIII. The memory may be disturbed & entirely abolished by various diseases, chiefly such as affect the brain as apoplexy, paralysis or epilepsy, tumors in the head from external violence; and also in fevers particularly such as are accompanied with an increased flow of blood to the head, by which the brain is affected.

CCLXXIX. Memory is seldom so depraved that it does not present things in their proper order to the mind; for when this happens we ascribe it to a disorder in the imagination

to delirium

to delirium.

CCLXXX. The imagination is that power by which a man can combine, divide and manage in his mind as he pleases those images which the memory has treasured up in the mind: so that by it he can represent to himself mixed and compound forms as those of men and horses, women and fishes &c as the Centaur, the Mermaid.

CCLXXXI. The imagination is more vivid than the memory and possesses a greater power over the mind, affections and nervous system; although memory itself possesses this power in a slight degree.

CCLXXXII. This faculty suggest innumerable images to the mind: but in a healthy man they are hardly ever confounded with those of the memory or with the real objects which are perceived by the senses; nor will a man in health and in a state of sobriety ever believe that the objects which his imagination represents to him as he pleases, are real as ever have been.

&c.

so. such an one, if it does occur, must always be considered as a disease.

CCLXXXIII. In infancy the imagination is weak, in youth it is the strongest, and in manhood & age it is minus entirely obliterated. it is likewise most brilliant in those who are sprightly, imitative and relative, and in those who are preternaturally sensitive; but in such as are torpid, frigid or stupid it is almost entirely wanting. this faculty is of service to the poet as well as others, for it is by it that he conceives, invents and finds out similarities and coincidences among things which do not strike the common observer; and tracing these at first as conjecture, he at last moulds them by means of judgment into a true science. And in this respect we are equally indebted to Homer and Newton.

CCLXXXIV. Both the imagination and judgment are actuated only by the perceptions which proceed from the sense of hearing or seeing; for

for there are many of the perceptions discernable by the other senses that are capable of being re newed with any force or accuracy.)

CCLXXXV. Judgment is that faculty by which we are able to contemplate the ideas which the senses of the memory & imagination present to us, so as to compare them together and discover their differences and similitudes, and deduce various conclusions from thence. This power in infancy and childhood is very weak, but as we advance in life it becomes more strong, and in old age it comes defective. It is hurt by all the diseases which are pernicious to the memory, for if there was no memory there could be no judgment.

CCLXXXVI. All these faculties are so purely mental that at first sight we cannot recognise any thing corporeal in them; but we find that they are affected by certain diseases of the body, and that the brain must be in a certain state before they can be properly exercised: and hence we conclude that it is the principal organ of the internal senses. There are some Philosophers and Physici-

ans

ders of celebrity who maintain that there is no change takes place in the mind without being accompanied with a corresponding change in the brain. This however is a circumstance involved in uncertainty; and it is of little importance to us to know it; nor is it easily reducible to the test of experiments. (192. 209). We are ignorant how we form knowing what changes are made upon the brain; or how it is different parts act, during the exercise of memory, imagination or judgment; but we cannot even observe a conjecture with any degree of certainty upon this subject when it is in a sound state.

CCLXXVII. Seeing therefore its function & disease is involved in such obscurity when in a state of health, we need not wonder that we are ignorant of the nature of many of its disorders; we are however certain that it is subject to diseases and those of the most severe and destructive sort hence they deserve our most serious attention; because in them the mind itself by which we are distinguished from other animals is either impaired or rendered useless

Eyth. In hypochondriacal cases we also find the remedy
agreed about unfavorably particularly when the
disease has been of long standing.

28th. There is an affirmative. Nothing can deter a
very irritable people from the impressions upon
the other senses as that of taste & smell. In
this way we find that an excessive degree of
love or aversion which has been produced
by touching or tasting any very disagreeable
sub will for a considerable time after
effecting the surface from which that sub is
taken communicate

CCLXXXVIII. The mind is said to be overthrown when a man confuses the ideas of memory or imagination with the perceptions of external sense so that he believes things do exist where they are not nor ever have been: or when he forms an erroneous judgment of objects, different from what others commonly do. But this rarely happens. The judgment may be found although the mind be hurt, and in this case it proceeds upon erroneous principles: thus a mad man will reason pretty correctly for if he supposes himself to be Jupiter he will think he has power over his thunder.

CCLXXXIX. An alienation of mind is termed Lunacy: and if accompanied with fever it is called Delirium. But if without fever and accompanied with anger fury it becomes Insanity. There is another species of madness in which the mind is only affected with regard to one object: and is perfectly sound respecting others: this is Melancholy. which is the greatest

-ancholy combined with extreme grief. But there is no accurate limits fixed between lunacy and perfect soundness of mind; for all sorts of preternatural hilarity borders upon insanity, and mirth and deed approaches to melancholly.

CCXC. Delirium accompanies different sorts of fevers: in some it is slight and soon gives of so that it can hardly be considered as a bad symptom; but in others it is very severe and is always to be considered as a bad symptom requiring the greatest care and attention.

CCXCI. Delirium is of two kinds either fierce or mild. Fierce delirium is preceded and accompanied with flushing of the face, pain of the head, throbbing of the arteries, ringing of the ears, and redness of the eyes, which are inflamed, fierce, sparkling and unable to bear the light; the sleep is either entirely lost or it is broken and disturbed with horrid dreams. The usual manners of the patients are changed and they are unusually

united in their blood: from being more be-
comes increase manage more invisible. The laxity
is first observed between the sleeps, or by his
burning watchful: the patient begins to give way
to his imagination, and the perceptions arising
from the external senses either do not exist or they
are not attended to the images are recalled by
the memory without order: they can't lye he be-
gins to rage, and there is an incredible and unu-
sual increase of muscular strength; so that it
often requires several people to restrain
one in a fierce delirium.

CCXCII. On the contrary we find the mild delirium
accompanied with a weak, pale, pale and collapsed
countenance; vertigo upon the patient being
placed erect, and great prostration of strength.
There is likewise pain of the head but not so severe
as the former case; the pain is seldom intol-
erable, but rather stupid and accompanied with quick
or frequent. The laxity is first observed when he is
half asleep, and may be put off for a little space
shutting the light from; or by his friends speaking
with

with him. He is alarmed frequently by false millions
of things but is regardless of the surrounding ob-
jects; at last he becomes stupid and insensible
to hunger or thirst even when his mouth is parch-
parched, nor does he mind his usual professions
so that the urine and faeces are voided involuntarily
by them the disorder increases these symptoms
are followed by twitching of the tendons, convul-
sions and fainting fits. till death closes the
scene. The other kind of delirium is of a changing
nature in which the patient alternately fails.

CCXCIII. The symptoms accompanying both species
of delirium, show that there is an unnatural and
unequal distribution of blood
through the brain and that it requires a change
to produce ease. It is highly probable that both
cases may proceed from inflammation of the brain
more or less general and violent; although we do not
consider the general symptoms of inflammation
in the body as very material in this respect.
The dissection of people who have died in this way
frequently shows a preternatural redness of all
a)

a part of the brain, and an effusion or separation within the head.

CCXCVI. But we ought to observe that the state of the brain may be altered so as to produce delirium by many other causes besides the motion of the blood. In many fevers particularly such as are accompanied with debility from the beginning the nervous system appears to be more affected and to a greater degree than the circulation of the blood; and we find many effects in the mental and corporeal functions proceeding from disorders in it besides the appearance of delirium frequently shows that it is from an unequal and increased action in the nervous energy; or there have been what is termed an incitement of it. The delirium which proceeds from poisons is of this sort.

CCXCV. From what has been said we may in some measure know why delirium is of various kinds both as to its violence and effects; and why it is in some cases encreased by noise, light or motion, & by stimulating medicines and heat, likewise

why

why it is alleviated at one time by bleeding and
fasting &c. and at another by wine and stimulants.
and also why in some cases it is diminished by
the patient's acting and conversing with his friends
or bystanders, or by the sight of known objects
as in sleep, in others it is encreased by keeping the
patient in bed; and helped by his rising gradually
till he is at last able to sit upright.

CCXCVI. The causes of melancholly and insanity are
involved in much greater obscurity; because these
occur without fever or any encreased action of the
vessels: they are also often hereditary and depend
upon some defect in the formation of the body chiefly
in the brain; and although they exist from our birth the
most expert anatomist has not been able to detect
them. We are also at a loss to explain why these
occur after long intervals during which the pa-
tients appeared to enjoy perfect health both of
body and mind: and also why in which they so often
the produce such devastations upon the state
of the body chiefly that of the brain: of whose
actions we are entirely ignorant.

CCXCVII We are however certain that the disease may be induced by any defect in the brain; as obstruction, tumors within the brain itself or pressing upon the skull; also by any violence upon the head; or according to some writers by a preternatural dryness or rigidity of the brain: it is likewise induced by the application of irritating and stimulating substances to the nervous system. And in some cases the mind is seized with so great an irritability, that the patient continues for a long time with little or no sleep, even when soporific remedies are used.

CCXCVIII. But even this very limited and imperfect knowledge which we have of the brain and nervous diseases is involved in considerable obscurity: although we find the brain to be affected with rupture, tumor or ossification, or to be irritated with any sharp substance &c, yet we cannot ascertain certainly what disease will proceed from such texture or defect: it may be epilepsy, apoplexy, hemiplagia, or sleepy melancholy or frenzy, or pain of the head, or perhaps no unusual affection.

For

but there are many examples of men who after they
have lost a considerable portion of the brain have
recovered and lived for many years, without feeling
any inconvenience: and there have been others who
after losing part of it have lived for sometime in
perfect health; but at last were suddenly seized
with convulsions which terminated in death.

CCXCIX. Besides all these already mentioned
there is another defect of the internal senses
which is quite different from either of them;
this is commonly termed **Fatuity**. Persons affected
with this disease are totally destitute of judg-
ment or memory concerning all external objects
and hence they are entirely incapable of dis-
charging the usual occupations of life. Fatui-
ty to a certain degree is common and natural
to all infants, and hence in them it cannot
be termed a disease; but if it continues be-
yond the age of infancy, it becomes a disease
of the most serious and generally incurable
nature. This affects as we can learn from

dispositions

dictions proceeds from the same causes as the other diseases of the internal senses, and it is often found to be a consequence of Epilepsy. when it proceeds from causes situated without the head or from sympathetic uneasiness, when these being expelled and the Epilepsy cured the fatuity will also leave the mind.

C. There is a considerable similarity between the fatuity observable in Infants, and that of old men when their judgment and memory begin to fail; but in these last the disease appears to proceed from a torpid and rigidity in the brain; but in the first from its being too soft and flaccid.

Chap.

Chap. XI.

Of the Motion of the Muscles

CCCI. Motility is that power or faculty by which the muscular fibre contracts itself upon any stimulant being applied to it.

CCCII. The stimulants which may be applied are of various sorts; as all sharp mechanical instruments; and whatever punctures, cuts, tears or distends the muscle will make it contract; the same will happen upon applying any acrid chymical substance whether from the vegetable, animal or mineral kingdoms. We may also mention the stimulants of cold, heat, electricity and various others.

CCCIII. Some of these stimulate chiefly by producing distention as what is called the dead palsy for the sake of distinction (p. 229.) But the contractions of these differ very materially from those of which we are now treating; being slow and constant in its action, and not happening till the distending power is removed, because it is unable

unable to overcome it.

CCCIV. But the contraction of the muscles is often very powerful, being often greater than the distending force; for it frequently overcomes it: and then it is attended with an elastic relaxation. Hence it is easy to distinguish between that vitality peculiar to the muscular fibre, and the elastic power which all the solid parts of the animal body are more or less possessed of.

CCCV. The cause of the contraction of the muscular fibre has been long a doubtful question among the learned: and it is still imagined in obscurity; we are however well acquainted with it, and we learn by examining a living fibre when cut from the body that it follows this law. At first it lengthens through its whole length, becomes thicker and thicker, denser and more rough, and in a little time sometimes during the action its fibres are in a little, more plain soft and a little lengthened: till at last it contracts to its proper extent.

CCCVI. There are however considerable difficulties in explaining how the muscles in the living

are

and demand body operate in this way. For the long muscles of the trunk of the body and limbs are not only contracted as the patient pleases, but they will also remain in for a considerable length of time; although when left to themselves they soon become relaxed. Besides in several hollow muscles as surround the hollow organs of the body we cannot comprehend how they are relaxed: as for instance those of the heart arteries and intestines and bladder; although we understand the action of these parts perfectly well and know that there is a relaxation necessary to their contraction: likewise in those muscles which surround the various openings and are called sphincters in a similar manner they are never entirely relaxed.

CCCVII Upon examining the structure, situation and termination of the muscles, with their connection with the adjoining parts we will readily understand their actions and dispositions in the body: and at the same time it will be obvious that all their actions are performed by that mutually

which

they protect; viz by their simple contraction, or alternate relaxation or by a combination or resolution of both. In this manner when a long muscle contracts, it will of necessity draw the parts to which its ends are attached together: and as hollow muscle in contracting will make the hollow which it surrounds narrower and of course will expell its contents through the proper openings; and a sphincter will close the orifice which it surrounds. And we find these are truly the use of the muscles.

CCCVIII. The muscles terminate in a substance of a thin, firm and shiny splendid appearance when compared with those of which the rest of them are composed. This part was by the ancients called the nerves, but among modern writers it has been called tendon for the sake of distinguishing it from the other substance called nerves. (102.) It is obvious that the Divine Artifex has given this form to this part of the

the muscles on purpose that they may fit the more aptly to the bones and other parts to which they are affixed; and that there may be a greater number of them inserted into any one place of a bone as is necessary in the joints that the motion may be more complete. The tendinous part of the muscles has no motion in themselves; and only act in place of cords that the action may be communicated to a greater distance.

CCCIX. It was long a subject of controversy whether the bulk of the muscle was increased or diminished when it was contracted. The difference (if there be any) is so very small that it can hardly be measured; nor is it yet certain if there be any difference or not.

CCCX The force with which the muscles act is at most incredible. This is seen from the immense weights they are able to raise; and in doing this a great part of their power is lost: for in the first place the tendon is inserted so near to the

of the centre of motion that it must act very obliquely: and because the fibres of which the muscle is formed, and the muscle itself is often situated obliquely with respect to the line of the bones to which part of the force is exerted against the rest &c.
You therefore add these to the powers which we have in the muscles, and by this means you will find it to be very great. and we must also add the weight, for the power the muscle can exert will be just double what it can sustain; because all powers of this sort being equal to each other the muscle will be drawn with as great force from the place from which it arises as it will be drawn at the place into which it is inserted.
A muscle when cut out of the body weighs but ounces; with the Twentieth part of the weight it will sustain when in the body: Hence (under) that it accurately the power of the living muscle will be immense.

(CCXI.) Nature does not appear to have attended [illegible] to the [illegible] of strength in her works

as

as Dexterity and elegance in the form of the body, that it may be calculated to perform all its motions gracefully.

CCCXII. Although the contraction is perfectly obvious in all the muscles, yet it is very different in different parts. There are some which capable of being contracted a fourth part of their length; and there are others which cannot contract a tenth part in some animals but in others they will contract a fourth part.

CCCXIII. The contractions of the muscles are performed with amazing rapidity. This is exemplified in the velocity with which some animals can run: and in the celerity of the tongue which is able to pronounce forty words in a minute; and there perhaps containing two thousand letters, although in expressing some of these there are several contractions and extensions required.

CCCXIV. These muscles are much easier moved than

than others; and this will be different in different men, and in the same animal at different times.

CCCXV. And the effect which is capable of producing motion in some muscles will have very little effect upon others.

CCCXVI. Philosophers who have studied the motion of the muscles have imagined that they have discovered various powers from whence it must proceed originally: but in reasoning upon this subject although they have done it with simplicity, yet they have sometimes attended more to subtilty than to truth.

CCCXVII. The muscles as well as the other animal parts of the animal body possess a considerable elastic power which is manifest even after death: but any other locomotive power which they possess proceeds entirely from life and the connection they have with the living nerves.

CCCXVIII. The power in the muscles which is the cause of this elastic property is what is termed

their

Their Tonic power which is the Stimulus arising from their distention and which is accumulative belonging to every muscle. 302.303) For almost all the muscles in the human body are more or less distended beyond their natural state; or that they would spontaneously spring from their formation.

CCCXIX This distention arises chiefly from the increased size of the bones to which they are fixed: and likewise from the reciprocal action of the opposite muscles; and from the weight of parts in which they terminate: and lastly from the fulness of those hollow organs and viscera which they surround and to which they are affixed.

CCCXX. The Tonic powers and vigour of the muscular action are both encreased by an increase of the distention and both lessened by a diminution of it. Hence the effect of the fulness of the vessels in encreasing the motion of the blood; and hence the necessity for blood letting in many diseases as being the surest and readiest means

means for terminating its motion.

CCCXI. This Tonic power however as far as it depends upon distention has its limits: for if the muscular fibre be long and much distended, instead of exerting its contractile power easier or more powerfully, it less does and destroys it: and if the muscles be so far distended as to be nearly broken they are long before they recover their pristine vigour

CCCXII. When a muscle is not distended beyond its natural state it will contract itself upon the application of any stimulus. This is what medical men have termed the vis insitum or innate power of the muscle.

CCCXXIII. Likewise if the muscle be untouched and the stimulus be applied to the nerve additional power to it a similar motion will be produced. But if the brain itself be irritated all the muscles will be agitated. This is what is called the nervous power and differs from the innate power only in situation.

CCCXIV. Lastly, when neither the muscle nor brain

or

& nerves were touched, the muscles can be set in motion merely by the effort of the will: and this is what is properly called the animal power because it is peculiar to animals.

CCXXV. All the muscles however are not subservient to the will: for many of the most important actions are performed without the animal being conscious of it or accompanying it: hence the motions of the muscles are of two sorts viz. such as are voluntary & involuntary.

CCXXVI. All the muscles of the head countenance, eyes, mouth, even to the throat; and those of the trunk, neck and joints are muscles of voluntary motion: although even in a healthy man sometimes as a consequence of disease they are moved when the person is not conscious of it.

CCXXVII. The involuntary muscles are those of the heart, arteries, secretory organs and those of the whole length of the intestinal canal, from the throat to the anus: the pupils

pupils of the eyes and sphincters of other places although they are in some measure subject to the will as those of the urinary passages, the bladder womb and those of the rectum.

CCXXVIII. The muscles which hold an intermediate place between these are the muscles of respiration as the Diaphragm, abdominal muscles, heart and all those connected with these viz to shorten to contract, strengthen, elevate or depress them.

CCXXIX. It is hardly possible to confound those powers which nature has made distinct, for a healthy man may lose the power of the voluntary motion: but it is hardly possible for any one to acquire the government of the involuntary ones.

CCXXX. Each of the involuntary motions are performed by means of some stimulus either applied directly to the muscle itself, or to some nerve which part at a distance from it and conveys it to it by the sympathy of the nerves: and in this way

way the stimulus may originate in the brain itself or from the ageing of the tissues which from the constitution and form of your bodies is able to affect certain parts in such a way from our birth that they are excited to motion.

CCCXXXI. From this it appears that the power of Power of nature has prepared such incitements as are necessary to produce action in those organs where it is necessary, for sustaining life, nourishing the body, or for discharging certain functions absolutely necessary for life. In such parts however whose action is not absolutely necessary for life; and where it is of little moment if not being always requisite dilated: he has placed the action in some measure under the control of the will; and in other cases it is entirely voluntary.

CCCXXXII. A man is perfectly conscious of those motions which are subservient to the will: so that not one muscle that exerts its power in moving any member which is moved by the efforts of

of the will, can escape his attention when, where & to what attention he directed it. By long custom & use this sensation becomes weakened and is at last entirely obliterated.

CCCXXXIII. But on the contrary the involuntary motions are never perceived unless we are sensible of them in the healthy body. If however they be too violent, or entirely stopped: or if they be performed with difficulty or impeded there is a very disagreeable sensation of pain immediately produced.

CCCXXXIV. The perceptions of the motions of those intermediate muscles as those of respiration depends entirely upon the attention being directed towards them or not. But if they are excited in any unusual way so as to produce pleasure their motions will be observed: and if their motion be stopped it is accompanied with very acute pain. (Hartley.)

CCCXXXV. The muscles of voluntary motion by being used, (if not to too great a degree) become more firm, movable, and powerful and also

also more knowing: hence we are unable to judge of a man's strength from his make. This was a circumstance well known to the ancient sculptors; and hence the difference in the muscles with which they represented a Hercules, an Apollo and a Venus.

CCCXXXVI. The strength and mobility of each muscle is increased by use; but as it requires the conjunction of several muscles to perform any motion by frequent repetition and custom that motion will come to be performed with greater ease promptness, expedition and accuracy.

CCCXXXVII. But if the motions are preternaturally violent, difficult or too long continued the strength is impaired and the person becomes fatigued. At first he performs the actions feebly with uncertainty and trembling; he feels an unpleasant sensation which at last becomes painful: and this is succeeded by a stiffness of the joints employed and then a debility and languor of the whole body

39. It is upon these principles that we found a long continued stability in any [illegible] after a sprain which is nothing but an obstruction in the [illegible] of the muscles

body, not which proceeds a strong desire for sleep. If the exercise be not interrupted, there is a great and universal defect of strength comes on, and sometimes a fainting of the mind which terminates in death itself

CCCXXXVIII. On the contrary the muscles of the two inferior orders cannot be strengthened by exercise, because they are healthy when their motions are always uniform: nor can they be fatigued by any exertion. The heart itself which is the strongest muscle of the body contracts about one hundred thousand times a day, yet after eighty years have elapsed it is no more fatigued than at the first. However after any very violent exertion to which they have not been accustomed the involuntary muscles will be in some measure weakened, but they never feel any sensation of fatigue.

CCCXXXIX. The muscles of respiration viz. of the thorax and abdomen are not easily fatigued: and although they differ from the voluntary

muscles

muscles is not always under the will entirely: and therefore not always capable of long continued and unusual exertion. Hence the sensation of fatigue is seldom overcome by them.

CCXL. But besides these the muscles of voluntary motion themselves are sometimes affected by other stimuli even in the sound man: and these in some cases equals what the person is conscious of them and sometimes when he is not, or even against his will. In some instances these arise from the will itself as an acquired impulse: in others they excite them to exertion as a mild and gradual impulse which is hardly perceptible.

CCXLI. These stimuli are chiefly the affections of the mind as anger, joy, fear, love and hatred which excite certain motions in the muscles chiefly those of the countenance, by which in most happens that each of these passions are expressed in the face better than by any other part of nature. If these are long expressed and frequently

repeated

repeated they are so strongly and constantly impressed that it is difficult to efface them: and hence we sometimes see danger depicted in a place where there is no danger: and upon this principle the art of Physiognomy is founded. Hence the muscles of the countenance there are others which are excited to motion by the same cause and hence some men exhibit various affections of the mind by their gait, gesture and voice so that the passions of the mind have the greatest influence over the muscles of involuntary motion: as those of the heart arteries, secretory vessels and intestines also those of respiration from these processes any increase or decrease of motion which takes place in the circulation of the blood: or any defect in the secretion or digestion and also any unusual affection in the respiration.

CCCXLII. The affections of the mind are divided into such as excite or depress because they either increase or diminish the vital powers of the

The exciting passions are nauseating: and the depressing ones are grief and fear. But besides these there are some of a mixed or doubtful effect: and which are referable sometimes to the one sometimes to the other of these classes: of this sort are reckoned those due to the one: because it excites or depresses the mind according as it is successful or not. Likewise gaiety and dejection and solitude sometimes act as an exciting affection and produce rapid and violent motions.

CCCXLIII. Both these sorts of affections are attended with danger and hence the affections of the mind were very properly ranked among the causes of disease (55). Such of them as act very powerfully sometimes produce such effects upon the nervous energy that they extinguish life: and others whose action is less violent are hurtfully by irritating the motions of the humours. Those which depress the mind debilitate the patient, and do hurt by the functions which irritate more

mal

natural and animal from whence proceeds
odious and irremediable maladies.

CCCXLIV. The cause of animal action is a curious subject and this perhaps is the proper place for taking notice of it. By it man is enabled to explore and contemplate object that are near him when he is not perfectly aware of doing so, although he can never be said to be entirely unconscious of it. It is particularly useful to the insane; for by it he is enabled to exercise his organs and hence to acquire the use of them. By this means he learns many things without being taught and that more perfectly than he could do from the instructions of any master. In this manner the insane by his own labours lays the foundation of many sciences for himself. This is less perfect in advanced life and in old age it entirely disappears. Nature allures man by a certain gratification that he feels in so doing to use both his

his organs of sense and motion: and by this means they are exercised and strengthened and he likewise learns many things with which he meets. By this stimulus and pleasure he is also incited to investigate more remote objects and thus many things which nature has veiled from human eyes are discovered by the mind's eye.

CCCXLV. Besides we do many things and acquire a knowledge of many others by imitation alone. The infant will imitate what it sees and hears without being conscious of it; and the adult will imitate when he is unconscious of it and perhaps unwilling. Hence a person will acquire the manners and speech which he sees oftenest without wishing to do so. The infant acquires what ever language he speaks from imitation & the ways since Philosophers say we would be a brutish and dumb race like the beasts of the field.

CCCXLVI.

CCXLVI. That sedition and tumult often
arise not only between several
men, but sometimes a whole nation at once,
is chiefly owing to this. That little contagious
and various affections of the mind, as
anger, revenge, envy, &c. will sometimes be propagated
from one countenance or gesture to the
hearts of a great number. Thus a desire
of fighting more than a hope of victory will
be inspired through a whole army from the
first motion or gesture of the general who is regarded
by them with admiration. And the same men upon
the victory being nearly gained, have been
struck with so great a terror from the ignominious
flight of one man, that they have hardly
dared, and could not be restrained by any
authority.

CCXLVII. That species of madness which is common
to some females after child-birth
is in part owing to this cause; so that even
the most thoughtful women in perfect health
are

and other human beings and rendered them insane by, have been suddenly seized with it upon seeing or hearing a fanatic of this sort.

CCXLVIII. In the same way some affections of the nervous energy as hysteria and epilepsy have been propagated by seeing persons affected with them in a wonderful manner.

CCXLIX. That principle which is denominated instinct is also a cause of action in many animals and in man no less than in them. Instructed by it an animal when new born seeks the nipple, grasps it in his mouth and sucks it by the aid of many muscles being put into action at the same time, and this is a motion not usually imitated by the adult. By the action of different muscles and the use under the management of different nerves, he is also able to govern his two eyes and direct them towards any object.

CCL. From instinct to proceed to the powers of the senses which impel man to take the nourishment

343 The effects of these passions or disturbing
of the mind are also most conducive when
the body is previously tyed or weakened by
disease hence the effects of fear have been
known to cure an attack of the gout after
it has come on although they have not
often if ever been known to act as a
preventative. I have also seen decumbent
cases of chronic hemorrhage and
other distressing symptoms much relieved
by danger when the patient was heavily
greatly weakened by abstinence

[illegible] to [illegible] its respiration and to propagate its species. Hence, hunger, thirst and desire incite us to certain motions directed to certain ends. There are also other desires dependent upon the state of the body to be called to mind; some of which are salutary and innocent; and which might all to be considered as spiritual. Of this kind is the desire of food, of drink, vegetables, plants and animal or aromatic substances.

CCCLI. There are many propensities to which the living is liable both in health and sickness; and these act as the causes of various motions of which the person is perfectly conscious. Among these we may mention the propensities which produce the evacuation of the faeces and urine, and what produces coughing, sneezing yawning, sneezing and vomiting. If the proper body is used in animals are the cause of these motions it has a tendency to excite; and if it be any way in any manner within the body it will excite the motion

CCCLII. There are many wonderful motions occur in the human body; and these four causes the less easily understood; because the moving parts themselves are unknown; but have the stimulus conveyed to them from some remote part. This may be done by means of that consent which is called the Human Sympathy or knowledge of which is of the greatest importance to the Physician both for distinguishing and curing diseases.

CCCLIII. The whole body may be considered as one machine whose various parts and actions all contribute to the same end. These are some of the parts for discharging functions assigned; but the greater number of them have their functions in common with each other: and these cannot be affected without others suffering at the same time and thus producing various alterations in the whole. Hence the sympathy is a general principle by which all the parts of the body are governed; and we may also

also cause it to act upon particular principles, for it is those parts destined to discharge certain functions will affect each other when the rest of the body is very little affected.

CCLIV. The general effects of this principle are observed between the brain and whole nervous energy and hence between the brain and whole body; and this is not to be wondered at if we reflect that the whole of the whole body is derived from the brain this sympathy is also observed to be very great between the bowels and whole nervous energy. It also find the skin itself and cellular substance when properly supplied with nerves and blood are both to be possessed of the same sort of sympathy with the other parts of the body. so that if a small part of it be affected in a particular way it will induce wonderful changes in the most remote parts of the body, as in the bowels kidneys, and through the whole nervous energy.

CCLV. We find many examples of this sympathy acting in a specific way; as that between the

—tic

the eyes between the Penis and Testicles of the same side; between the Uterus and Mamma between the Lungs and Diaphragm; between the Fauces and Stomach and different parts of the Intestines; and also between the Stomach and Rectum; and the abdominal muscles and Diaphragm.

CCCLVI. Some of these sympathies are considered as natural and others morbid; because some of them appear when the body is in perfect health and are absolutely necessary for discharging some of its functions: others of them never appear but in cases of Disease and are both a symptom of its existence and also of its situation. This last is seen in the sympathy which takes place between the Kidneys and the stomach, between the urethra and inside of the Diaphragm and that between the feet and the bowels, as in cases of Calculi, Gout, Hysteria and cold.

CCCLVII. Lastly there are some kinds of sympathies which never appear in health, and are only

to be met with in some fainting fits, diseases, or indeed pain, from a very slight wound, and in pain and heat of the skin, even after loss of the bladder.

CCXVIII. The reason of these things is very obscure, for how there can yet been any sympathy between these causes. We have no fine vessels there, that the nerves of these sympathies both general and special depend upon that connection which subsists between the brain and other parts of the body; and that a stimulus whatsoever it be applied will produce such an effect upon the brain, that the whole animal energy will be altered, or some particular part will be incited to motion. And so, in these diseases the case for if a nerve running between the parts connected by this sympathy be cut or compressed or destroyed in any way damaged, or if the brain itself be destroyed the sympathy is lost although the parts themselves, if pressed or touched their moving power when a stimulus is applied directly to them.

CCCLX

CCCLIX. There are three kinds of sympathy which proceed from the parts being near each other, being connected by close cellular substance; of this kind is the sympathy which is between the stomach and the other abdominal viscera, the liver, pancreas, spleen, mesentery, the 4th. bladder and intestines. But it must be confessed that the sympathy which subsists between distant parts cannot be accounted for upon the principles above laid down by the most celebrated Physicians, Anatomists & Philosophers. The smallest connection by the ramifications of nerves between parts so distant.

CCCLX. There is a species of morbid sympathy not so common as any of the former, which often proceeds from one part being particularly irritable, moveable or weak, so that it readily affected by any defect of another part, being liable to the irritation than the rest of

the body.

the body. This is perhaps the reason why many diseases which proceed from a general cause fall most readily upon such persons as have a weak or morbid nature.

CCCXI. Hence there are many motions in the animal body, and still more in its parts in a diseased state, which are evidence for examining many less apparent and more distant symptoms, by which the alternate and various disease and the present state of the whole machine may be discovered by a long time. Sydney.)

CCCXII. If it still a question undecided among the nature and power of the animal motions, whether we are to ascribe these salutary motions to the general laws of animal motion, or if they proceed from some particular added to the power of generating that which the animal machine possesses and that because it is affected with any disease it excites such motions for the purpose of re-

down your throat.

CCCLXIII. It is certain that there are many things which by nature act as stimuli and have a tendency to excite motion, which will sometimes act as incitements to it and produce very sudden motions. This however does not affect the question, for we know by the general laws of motion which we have already laid down, that there are many circumstances which affect the velocity and even certain conditions will act as very powerful stimulants. Debility is an affection which retards any; and so does also at all things that impede the usual action of the organs.

CCCLXIV. There have been medical men of celebrity who have referred all these motions to the imagination of the mind itself; and say that it judging when any danger was approaching made some effort to remove it; and that with this view it produced these motions or brings the last words to concerning the danger.

CCCLXV.

392 His description of the appendicular
cysts between the ileum and stomach and
between the pancreas and lower lobe of
liver during pregnancy) proceeds from the
connection between the veins of the
skin of the blue Rat &c as it is found
that the internal membrane of these veins
lose the glandules and the external ones
alternately.

CCLXV. No man can contemplate Nature; but must see that it often excites motions of great salutary tendency; and that it is the duty of the Physician to imitate and promote these as far as possible: but at the same time he must observe that diseases are cured by opposites but must see that there are many of these motions perfectly useless, or too powerful to be useful, and of course it is the duty of the Physician to restrain and subdue them, as they subject the patient to double danger. But if all these motions are in general the case with some of them we are quite to rely almost entirely upon their accord referring them to the agency of the mind; because we know that there are many motions that have no connection with the mind, and of course by instance it is not even conscious; for the mind is neither able to produce them, or stop them when it is for

on

or restrain them when they are produced from any other cause: so that they are frequently without being considered as a mysterious beneficial tendency in the most foolish man, or even in the brute as in the most intelligent philosopher or physician. From these however a medical man may learn what may be the probable issue of a disease, from the strength of this hidden power which exists in the body: and it may direct him in his practice, for although it is as yet buried in obscurity, even in latter we hope it may yet come to be understood.

CCCLXVI. All those motions which may strictly be called animal or depending upon the will, and also those both animal and vital one which we have only a limited authority, are generally exerted in a muscular manner. In these we ought chiefly to observe the power, velocity, direction, time; and also their return and the variation they produce. Motions which are

at first are performed with difficulty, and produce
unpleasant sensations; by frequent repetitions
become almost habitual, and are easy and
promptly performed: so that at last they will
be performed without our being conscious
of it, if we are not attending to them: when left
to themselves they are always performed in the
same order; and if some of them be omitted
not be changed. The muscles of motion also
acquire greater strength and velocity by being
used. as was observed 335, 336. Hence arises
that stimuli and certain motions which pro-
ceed from them that are wont to return at
regular periods; but by custom they may be
made regular; of this sort are the appetites for
food and the propensities to discharge the u-
rine and feces and the like. By custom also
we may acquire new appetites which accord
easily laid aside, as that for Tea, coffee, and
narcotics, and many things which so far
from being natural to us, are at first nau-
seous

especially

disagreeable that they can hardly be tolerated.
And it is from the same principle that many
stimulants when they have been long used
require to be stronger than nature at first
needed them to be. Hence it happens that a
man may so change his habits, that he may
become almost new modelled if he inclines
and hence the remedies of the greatest impor-
tance in medicine both for correcting defects
in the constitution, and also for keeping off
diseases ought to be administered with cau-
tion that the change may be effected slowly
and prudently.

Chap.

Chap. XII.

Of the defects of muscular motion. too great mobility - rigidity. — paralysis. and spasm.

CCCLXVII The moving power may be vitiated in many different ways; and this is a subject de serving the most attention, because most of the diseases of the body depend upon it: as far as the motion of the muscles is regarded. And the functions of the living animal.

CCCLXVIII The mobility itself may be too great. But we must observe that this is different from what is termed the vigour of the muscle. The mobility is that power by which the fibres of the muscles are rolled & contract; and the vigour on the other hand is that power by which the contraction is performed. These forces are sometimes observed to be both in creased: and at other times only one of them is so: and these two states may proceed from different causes.

CCCLXIX The mobility is said to be too great when it is excited to motion by too slight a stimulus: or when the usual stimulus produces the motion

a motion; in either case the parts are animated.

CCLXX. Some men are liable to that malady, from a peculiar habit of body which is hereditary from them. And women are more liable to it than men. In early life the mobility is very often too much so; in youth it is weaker than in infancy; and in manhood it is still less. In old age it is frequently unnaturally weak. An increase of the mobility is also produced by an idle or sedentary life; which also follows by a suppression of the usual evacuations, or a full habit of body. It is also in some cases an effect of a sudden diminution of the blood; as by a, or flaccid state of the solids. And sometimes it occurs from too great a tenuity of the moving fibre; or from the use of light diluents and heat applied in any way; and also from an increase of sensibility.

CCLXXI. The mobility may be too great in one place or in the whole body, according as the cause

cause of it be generally or partially applied.

CCLXXII. A general vigour is seldom considered as a disease, but we sometimes observe an increased vigour of the muscles of one part of the body, that is attended with pain. In some diseases of the mind or those produced by phrenitis, we find a great increase of the power of all the muscles particularly those of voluntary motion, which is considered as a morbid symptom. The cause of this increased vigour is very obscure, but it is plainly referable to a disease of the brain.

CCLXXIII. A more frequent and more important increase of muscular vigour is that which happens in the fibres of the involuntary muscles, particularly those which are connected with the circulation of the blood. For when its circulation is preternaturally increased, it is attended with many inconveniences to health and may be dangerous to life. A slight degree of this increased vigour preceding the whole body can

Attitudes

Malades what is called the Phlogistic Diathesis which renders men liable to inflammatory diseases; but when it is more encreased and all at once in one place it forms true inflammation.

CCLXXIV. The great vigour of the muscular fibre may proceed from a preternatural encrease of the nervous energy as happens in maniacal persons and violent affections of the mind: or from a great attention of the fibres by which means they receive the impression too acutely; or it may arise from a distension of the arteries or other parts from too great a fullness of the blood: or from cold particularly when followed by heat as in the spring season. Or lastly this affection may happen without any alteration in the nervous energy or tension of the fibres: but from their action being encreased by a stimulus more than usually powerful being applied: or from the usual stimulus being applied when the fibres are already in a state of too great irritability.

CCCLXXV

370. This increased mobility often appears in the form of nervous complaints. and when there is a great deminution of the vigor as in Typhus fevers or after long protracted disorders which have a tendency to weaken the system.

CCLXXV. From this we may understand the effects of many things whether good or bad; and also the effect of many of the remedies we use both for increasing, lessening and restoring the power and action of the moving fibre; as that of thinking or bathing; and that of exercise, of sleep and abstinence and evacuants

CCLXXVI. As torpidity is the nervous, so mobility or debility is the nervous great disease. Torpidity may therefore be defined a great diminution of the mobility that the body is incapable of discharging the functions of life. Hence arises an opposite cause to that which produces too great mobility. chiefly from a hardened or rigid state of the solids, sometimes from a bad or depraved state of the fluids produced in them by diseases; likewise from a peculiarly cold temperament called Phlegmatic; and also from a want of sensibility, inactivity, cold, long continued cold, bad diet, and a bad state of the body. This is a disease to be feared, because it is very difficult to cure, being accompanied with a great diminution

of

of the powers of motion, so that the body can do
things however opposing nature itself, and destructive
even to most powerful, but unless it will avail.

CCCLXXVII. Debility is that state in which the motion
of the muscles whether voluntary or involuntary cannot
be performed with proper force. It is necessary
previous to almost all diseases and for a consi-
derable part of each of them. Whatever renders the
body obnoxious to many disorders rendering it less
able properly to resist. Often proceeds from
the original fabrication of the body and cannot
be cured by any remedies or means yet known. There
are various degrees of power and strength pos-
sible to different ages, so that what could be per-
formed easily by one in the prime of life, and
would not discommode him, would be quite oppo-
site to the powers of body and perhaps might kill
either of them. Hence we often find a mere state
of the strength that proclaims debility is
body or mind, or affection; and it may happen from
a diminution of the necessary energy whether it
proceed from a defect of the brain, nerves or the

nerves

and that communicated to the muscles; and may proceed from disorder of the muscles themselves or from a defect of the tension of their fibres; or by their becoming rigid or stiff from the heavy living substance by low living, want, evacuation, or disease either partial or general.

CCLXXVIII. The greatest degree of debility when the powers of the muscles are almost entirely obliterated is what is termed paralysis. This is either a general affection of the whole body or of some particular muscles of it; and it proceeds from some defect of the brain or nerves which frequently closes our sight in the morbid sections, because the nervous energy may fail and the structure of the organs be perfectly complete, but we may often meet with compression, obstructions or ruptures and effusions of blood or some serum or humours in the cavities of the brain or some of the nerves. Paralysis is sometimes occasioned by the effects of certain poisons upon the nervous energy or the nerves. Certain metals as lead or mercury &c. sometimes from particular diseases of the muscles at a distance from the brain, as in the Dry-ness colic, colica pictonum. This affection is also met with in single muscles without the brain

or nerves being anyways hurt; and in these cases it proceeds from violent pain long continued or from inflammation, increased tension (312) relaxation or from the muscle being destroyed as we see in the case after rheumatism, gout, distortions and pains; or in the bladder from suppression of urine.

CCCLXXIX. That kind of Paralysis which is denominated general and which arises from a defect of the brain is usually found to affect the whole body, generally first it confines to one side, and in this case it is named Hemiplegia. It has also been found by the observation of surgeons that it is the opposite side of the body to that of the brain which is most frequently affected. If all the parts below the head be affected it constitutes what is called Paraplegia. In Paralysis sensation is primarily affected in some cases entirely destroyed, and often blended the worst kind of it happens in which motion, and sensation are all gone, & then appears known the whole voluntary muscles, accompanied with loss of feeling and sleep, gone. That is termed Apo-

plexy.

apoplexy. Thus for ex. from a ruptured state of the brain: and a contusion may simulate it: in practice it is necessary to view all the circumstances together & investigate by the symptoms (whether) air has made poisonous by being detained & vitiated (by) when taken into the lungs.

CCLXXX. The next effect of mere contusion is Tetanus or spasm: which is what is commonly called cramp, which is either an idiopathic or symptomatic disease. It is a violent and unnatural action of the muscles. It divides this disease into two kinds termed the tonic and clonic. The former is frequently called convulsion & distinguished from the other which is termed simply spasm.

CCLXXXI. Spasm is therefore a constant violent and unnatural contraction of the muscular fibre but convulsion is an unusually violent contraction with an alternate relaxation. In both cases if the motion affects the voluntary muscles it is performed involuntarily: and the effect is the same whether it be in the voluntary or involuntary muscles. Besides both species of this

that disease proceeds from the same causes, and are often to be observed in the same patient; or the one is sometimes seen to pass into the other.

CCCLXXVII. The remote habit of body or circumstances of visible nature most subject to spasms: hence the disease is most prevalent in women and children, or in those who are weakly, luxurious or idle and of a plethoric habit of body.

CCCLXXVIII. The irritation in which a predisposed fit is by any stimulus (302) applied to the brain nerve or muscle of the sympathizing part; of these in any member. Irritation; warm irritating the intestines; acrid matter. Dissected flesh; the blood in loading the bowels or intestines; any irritation of the mouth or nerves as from burning of cutaneous parts; pricking upon the nerves; tumour formed or situated; or the pitted state of the blood vessels from gout or intense affections of the mind. Sudden evacuations and from certain poisons when taken into the body. Sometimes it arises from very slight causes, little understood and not easily

easily distended, and requires a great degree
by custom.

CCCLXXXIV. Sodium is both useful and ornamental
in many diseases and often constitutes the greater
part of them; it is very difficult to understand
and also to cure, because it assumes so many
different forms, and exhibits so various symptoms
according to the various organs which it attacks.
and whose functions it disturbs, stops and in-
verts: it is an astonishing ornament sometimes
it is a disease intervenes with the seeds of the
constitution and not easily removed by any
alteration we can effect in it.

Chap. XIII.

Of Sleep. its uses causes and varieties. its effects whether arising from an exception to Definition 4: and the evils arising from them. of the reason and cause of Dreams.

CCCLXXXV. Man is not capable of exercising the senses and voluntary motions perpetually: the functions of both require to be suspended at times, that the powers of those muscles and senses that are fatigued by exercise may be refreshed by quietness and ease.

CCCLXXXVI. The one state in which we cease to feel the senses and govern the muscles of voluntary motion is known. the state of wakefulness: the other in which there is neither sensation nor voluntary motion is called a state of sleep.

CCCLXXXVII. Either of these states may be more or less perfect as that a person may not be quite asleep and yet not capable of directing his functions as if perfectly awake. Those who are in perfect health sleep the soundest: and in their state they are neither able to feel nor the voluntary motions of are they capable of directing any of the senses

See a Theory of Sleep in Willichs Lectures
on Diet p. 492. See also in Abernethy, p. 496.

do not extend to internals, except in men; but when people are half asleep they are able to perceive many external objects although they do it inaccurately. They can remember, invagine and think of many things; and are agitated with various mental emotions. They frequently speak, rise and clothe themselves, walk about and perform many things as the same as if they were awake. But the vitals and natural actions are performed in the deepest sleep, the same as when awake, except that in some cases they are obscured like a little shade.

CCCLXXXVIII. The most comfortable sleep is obtained after a man has gone through the usual labours of the day, taken a light supper and paid his tribute to Venus with moderation, the dictates and silence of the night at the same time contributing to it. It is preceded by a desire for quietness and tranquillity both of body and mind, a sensation of weakness and lassitude and fatigue chiefly in those muscles which are

are most used; yawning and stretching of the joints; a dullness of the external senses and a confused state of the internal. The attention is distracted and ungovernable; the memory incorrect and unwilling to be exercised. The imagination is vague and at last so much troubled that a species of delirium comes on which ends in a total oblivion of all things. The muscles being fatigued are relaxed so that the cannot govern the joints to which they are attached nor can they support the body. The eyelids shut now and at last are closed; the jaws fall, and the head nods; and all the members being relaxed the body rests and is bent forward unless the person lies down to sleep. The pulsation of the arteries becomes slower and fuller; the respiration is slower and deeper, and many people snore during their sleep. The heat is diminished and so is most of the secretions; and the usual appetites and propensities are not regarded.

CCCXXXIX. The length of the sleep depends much upon

upon the age temperament habit and also upon
the state of the body at the time the sleep commences.
It is broken off by various stimuli applied to the
body both external and internal, as light, noise,
slight touching, hunger and thirst or the propensi
ties to discharge the urine &c &c. But when the
sleep is broken it is not done so suddenly but
we can observe the disturbed state of the intimate
senses, and also any dreams, or the dulness and
imperfect state of the external senses; hence we
find morning dreams are better recollected than
others. At last when we awake more perfectly we
learn and shall to such members as have been
used in the same way as we did when we were
about to fall asleep: by and by we begin to feel
the natural propensities, and soon acquire
the perfect management of all the faculties both
of body and mind.

CCXC The remote causes of sleep are like
from us, and perhaps they may be buried deep
in body for a long time. It has been very unsuccess
fully attributed to a exhausted state of the ner
vous

vous fluid; because we meet with many exam
ples of sleep being prolonged after we might have
expected that any defect of the nervous fluid,
was supplied and that it abounded in a sufficient quantity

CCCXCI. Nor do we suppose that sleep proceeds
from a compressed state of the brain; for such
a state of compression has never yet been dis-
covered in sleep and the stupidity which pro-
ceeds from a compression of the brain is very
different from natural sleep for it neither re-
freshes the strength nor can it be interrupted
but that it returns again as soon as the ob-
stacle which broke it is removed. Whereas na-
tural sleep may be interrupted without any
of the causes which induce compression of
the brain being used, for it is easily broken
by any stimulus.

CCCXCII. But all the symptoms which accompa
ny sleep shew that the whole of the nervous
energy and the brain itself is materially al-
tered

here be cut upon however what that alteration may be. But it may be of service to Physicians to know what the remote causes of sleep and wakefulness may be by which that alteration is produced, and by which means they can with certainty modify sleep or circumstances may require.

CXCIII. All the senses both external and internal, and all affections of the mind and actions of the muscles, excite the nervous energy and keep a man in a state of wakefulness, in proportion to their violence. Thus light, noise, pain, cares, joy, grief, fear, anxiety, hunger, thirst &c. prevent sleep. But no impression upon the organs of sense, or a very slight one as that from the humming of bees, the murmuring of a rivulet, a dull heavy ratio, or uniform action of memory or of matter labouring or agitating for the mind excites and produces sleep.

sleep. An increased flow of blood to the head does often occur in fevers previous to sleep; but a free and equal distribution of blood through the whole body chiefly to the extremities often induces it. Whatever relaxes the body is favourable to sleep; hence the different evacuations, bathing, fomentation, and heat itself is favourable to promoting it. After taking food and copulation sleep is easily procured, because the body is relaxed and pacified after the violent irritation. Intense cold long continued produces sleep which cannot be easily broken and commonly ends in death. There are likewise substances which when applied to the body externally, allay the nervous energy, and by rendering it less fit for sensation and motion produce deep sleep. Of this kind are the narcotics termed Narcotics as opium and the like: among these we might to mention wine when taken in too great quantities, and various bodily diseases as Cancers &c. Lastly we may

may consider watchfulness as a cause of sleep; because a man when he is awake is always exercising his organs more or less and thereby diminishing the nervous energy. And the more he put the exercise the greater will be the necessity for sleep.

CCXCIV During the time the foetus is in the womb it appears to sleep; and when the birth is premature and the child carries it proper to first months for the most part in a state of sleep. Infants usually sleep a great deal. Men and boys who spend a laborious life, sleep more and deeper than those who lead a luxurious or sedentary life; because those who exercise the body well are neither overburdened with food nor have their minds occupied with cares. Comfortable sleep is the reward of labour virtue and temperance and it is not easily acquired by those who don't deserve it

CCXCV Besides during the time in which the body is growing it requires more sleep than at other

times

times because the sleep has a considerable effect in nourishing and refreshing the body. In middle age men sleep most. But in this respect custom has very great influence, for while some are satisfied with 6 hours of sleep others require 10 hours in every day. In very old age men become almost in a state of torpidity and pass the greatest part of their time in sleep.

CCCCVI The uses of sleep are perfectly manifest from its effects in the human body. Sleep is the parent both of body and mind when they are exhausted by exertion; it restores vigour and alacrity, and makes those persons as fresh as when they were wearied with labour, and become stiff, painful and breathing, mind powerful and moveable. It restrains the fluctuations of the vessels which turn too powerful & wears sight and brings them to their proper standard in the morning. Likewise appears the favourable for promoting the digestion of food and application of nourishment to

repair the loss of the solids: it removes the
secretions and excretions and by allowing the
humours to thicken renders the body less
nutritious and more cooling. Hence sleep is not
only serviceable for preserving life and health
but it is absolutely necessary for that purpose
and it likewise acts as the best remedy for
curing and relieving many disorders.

CCXCVII. A deficiency of sleep is hurtful in many
ways but chiefly as to the nervous energy. Hence
the organs both of the external and internal sense
and also those of motion do not
discharge their functions. Hence the sensations
are either entirely obliterated or rendered dull
& not natural; it likewise induces pain
of the head vertigo, inability, loss of memory
& a species of delirium or insanity it relaxes
the weakness of the joints or an imperfect and
disordered action of the vitals against which
& fluxes, heat, fever, depraved digestion so that
the bodily tissues and the secretions and
ex-

excretions are either encreased deminished or
altogether vitiated.

CCCXCVIII Sleep is procured both in the healthy
and sick by those causes we have already
described (393) but particularly in the latter
it is likewise defective in many disorders of
which there are some where the pain anxie-
ty or uneasiness is not so great as to produce
this effect. In almost all fevers the sleep is
unnatural both from the general uneasiness
there is, and also from the encreased flow
of blood to the head: or from the bowels being
loaded with crude aliment or too great a
quantity of drink. This is likewise the rea-
son why hypochondriac and hysterical peo-
ple sleep so ill; viz. because in those who
have the digestion impaired, the stomach
and bowels are subject to very slight disor-
ders: and the least of these is sufficient to dis-
turb the sleep especially when the body
is already preternaturally mobile or irritable

CCCXCIX. Too great a quantity of sleep is hurtful both to the healthy and sick for the same reasons: but it is particularly so to the latter because when the strength of the body is diminished that of the disease is proportionally encreased. Hence it produces headache, Delirium and depraved digestion even in the healthy all which it will encrease in the Diseased. Hence too much sleep is not only a distressing symptom in a disease; but is also a frequent cause of even serious evils.

CCCC. Too great a quantity of sleep is likewise attended with bad consequences. It produces general debility, torpidity, dullness and even fatuity. It lessens the motion of the blood and all the secretions and excretions. from whence proceeds corpulency, fatness, flaccidity and an inability to perform all the functions of life.

CCCCI. The cause of this sort of sleep is an encreased state of the different causes of sleep

Sleep in a time (365) or some defect in the brain
from compression or effusion &c. or in a coma
as it appears to proceed from a general addi-
tional debility produced from some immediate
cause as that which happens in the termi-
nation of some fevers or in a state
of convalescence after other diseases, but in
these instances much sleep cannot be consi-
dered as healthy, nor does sometimes find a
long and unexpected lethargy as a consequence
of long continued grief or fear. Lastly some
men seem to sleep longer than proper from
custom, and that without appearing to suffer
any inconvenience from it. There have also
been examples of men who have continued
for days and even for months in a state of
sleep without any manifest cause for it.

CCCII. Those dreams which happen to people
when asleep and often agitate them with
sensations of delight, fear or terror, which
do transport them to unknown, and
usually

usually considered as dreams, because they either do not happen to them when [illegible] asleep, or if they do they leave no traces of them when awake so are not remembered. (1787)

CCCIII These happen either from the persons not being perfectly asleep and having the memory and imagination opened but not under the controle of the will; or from certain impressions being made whether external or internal so strong that the person can perceive them although they are not perfect as to break the sleep; and of which the person endeavours to form some judgment but can form only of them as the images of the memory and imagination in a confused degree. They are either shortly soon forgotten by the person during his sleep or not being under the controul of the will are never taken notice of.

CCCIV Dreams appear to be most common to people when they fall asleep or when about to awake even when they are in perfect health and

and

and not exposed to any irritation: hence dreams
seem to proceed from some bodily uneasiness (184,
185) as from it lying in a supine posture upon
the back being overloaded with food or wine.
Particular dreams are indeed by some imputed
in part to the admission of cold, from any
inequality or hardness of the bed; or from the
state of the genital organs, or from fevers and ca-
tarrhal disorders of the breast. A person on
whom perfect these sensations: he immediately
seeks a cause for them and often fancies the
most absurd and ridiculous ones.

CCCV. The perception which dreams affect is remark-
ably strong because the whole attention is di-
rected towards it alone and is not restrained by
the operation of the judgment. Hence in dreams
there is no power of the mind; but the sensa-
tion of fear, grief, heat, or whatever may
be engages the whole mind and engrosses
the whole powers.

CCCVI. Dreams are very fertile and remark-
ably

ably swift: so that a long series of years and a great number of transactions will be presented to the mind, contemplated and disappear in an instant of time. This seems to be similar to the circumstance of a person hearing the noise which calls him to rise like a person who generally a long time before he is perfectly awake.

CCCVII. Dreams are much regulated by custom so that some people can keep them entirely off: and others have acquired a power of managing in some measure as they please. Among such an immense number of odd and ridiculous things as are dreamt of it is not to be wondered if some of them are quite idle and others are true; for if any one of sound judgment when awake shall attentively employ himself in meditating upon many things, he will foresee many events which will probably happen.

Chapter XIV

Chap. XIV

Of the circulation of the blood

CCCCVIII. The subject next in importance to the action of the heart is the circulation of the blood because the organs which move the blood have an intimate connection with the brain and the motion of the blood is absolutely necessary for exciting the brain to discharge its offices. So that these two functions mutually assist each other and the one cannot act without the aid of the other.

CCCCIX. The great loss of blood which produces death from a small wound in any part of the body shows that the blood is diffused through the whole of it.

CCCCX. The course which the blood follows in going about is as follows viz. It is brought back from all parts of the body and passes by the veins directly into the right auricle of the heart which it distends and stimulates to contract. This auricle by contracting forces the blood into the right

right auricle: and it being contracted by the same irritation propells the blood into the pulmonary artery by which it is distributed through the lungs. From these it is conveyed back by the pulmonary veins & poured into the left auricle from whence it is forced into the left ventricle. This ventricle with a great force propells the blood into the aorta and its different branches by which it is sent through the whole body; and being taken up by the corresponding veins it is again brought back to the right auricle as before described.

CCXI. That fact in the course of the blood is easily seen from the disposition of the different valves in the heart and mouths of the arteries and veins which are placed to prevent its regurgitating. It may also be demonstrated by ligatures applied to the arteries and veins; for in the former they swell between the ligature and the heart and in the latter upon the

the

the opposite side. And lastly we can have no other demonstration that this is the course of the blood in such animals as are transparent.

CCCCXII. But it is also impossible how the ventricles of the heart contract in this order, for we find that the contraction of both auricles is performed at the same time and of course the ventricles will be then relaxed; and again upon these contracting the auricles will be relaxed at the same time.

CCCXIII. Upon the approach of death the ventricles of the heart (left) side first cease to act and then in corresponding auricle, by which means the passage of the blood through the lungs being stopped; then the right ventricle and lastly its auricle ceases to move. Hence it happens that during some time the blood which ascends and descends by the large ventricles is forced to return and to go along smaller vessels a slight motion in these.

CCCCXIV But in the parts before it has reached the

the circulation of the blood is very different. for in
the first place a great part of the blood which
should pass by the pulmonary artery does not
enter the lungs (for these not yet being expanded
cannot receive much of it) but passes into
the aorta by the arterial canal. Then a great
part of the blood which passes through the aorta
is conveyed to the placenta by the umbilical
arteries: and from thence being brought back
by the umbilical vein, it is carried partly into
the vena cava by the venous duct: and partly
into the liver: and after performing a course
not well understood through that part it is
borne into the vena cava and right auricle
of the heart.

CCCXV. Both the arteries and veins resemble
a tree in appearance of which the large trun-
ches are considered as trunks: and are divi-
ded and subdivided into so minute ramifica-
tions that our senses cannot pursue them.
in all however they follow this law: that

each

each of the branches are less than the trunk from which they spring; but if we take the Diameters of all these together they are generally a little larger than the principle trunk.

CCCCXVI. The smallest ramifications of the arteries (but never the large ones) when bent back become veins, or are joined to the veins by what is termed anastomosis; and the smallest veins by receiving more and more branches gradually increase and form the vena cava.

CCCCXVII. But in the abdomen the structure is in my Different and the return of the blood by the veins performed quite in a different manner. The blood is conveyed back from all the viscera which are subservient to digestion as the stomach, intestines, mesentery, omentum, pancreas and spleen, and carried into the large vessel called the vena portarum; this diffuses it like an artery through the liver that it may be well supplied with blood;

from

from this place after the gall has been secreted from it; it is taken up by the hepatic veins and poured into the vena cava by which it returns to the heart.

CCCXVIII. In the head has we observe something to differ in the distribution of the blood. Here we find very frequent joinings or anastomoses of veins of the large vessels; and the small veins from the blood almost directly into the larger ones called sinuses; but which they are joined in a reflected manner

CCCXIX. Lastly we observe a particular structure and a different course of the blood in such parts as are liable to the erection; as in the male penis and in papillæ of the female mamma; and also in some parts of generation in both sexes. In these situations the blood is diffused through various cavities in the cellular substance: and in this part it is supplied more copiously by arteries than

when it is taken up by veins: & this by its having these parts are distended erected and rendered fit for their offices; after the performing of which it is brought back by the veins to the heart as in other parts.

CCCXX. The powers which produce the motion of the blood are first the contraction of the heart by which it is propelled through the arteries with great force; but it is obvious from the effect of heat and weakness of the pulse in paralytic limbs that this force is by no means capable of propelling the blood through the whole body although it is felt in every part of it

CCCXXI. The arteries are assist in producing this effect both by their elastic power and also by their muscular contraction. The mass of blood which is propelled from the heart into the arteries pushes forward that mass which was in the artery before; and as it prepares the distension from the property of its fluidity it likewise distends

tion of the artery. This distention produces the pulsation which we feel with the finger. But the artery being distended by this means is stimulated to contract in the same way as the heart; and this contraction is performed with a quickness so great that we cannot distinguish the smallest intervals of time between the stroke of the heart and the following which is next to it. And that the arteries, in the moment previous to the

CCCCXXII. The fabrication of the arteries plainly shows the action for which they are designed; for they are manifestly formed with a muscular coat; and many experiments which have been made upon living animals as when sharp mechanical stimulants (or poisonous chemical ones as will be mentioned) have been applied to the arteries violent contractions have been produced. This is also seen by inflammation whether it happens of itself or be produced by artificial means as by the application of cantharides or blisters to the skin. Now can we give any other

other reason for a preternatural decrease of the
cretion when the motion of the blood is wrought
decreased through the body except this
CCCXXIII. The contraction of the arteries always
propels the blood from the heart to the extremities
parts of the body; and the reflux from the position of
the semilunar valves at the mouth of the large
artery by which the passage back to the heart
is perfectly shut up; so that there is no other
way for it to go but forward into the artery.
Besides the contraction of the arteries commences
at the heart first although that contraction is pro-
pagated with great rapidity to its minutest
branches and this in some measure directs
the course of the blood; likewise the office of
the valves is to prevent its return to the heart
so the passage forward is perfectly free.
CCCXXIV. The blood being impelled by these forces
passes into the veins & be brought back to the
heart. But we are not yet certain what may
be

113. It is from this contraction of the right
Auricle and ventricle & the want of co
relation in the lungs that respiration
begins to fail. And when the failure of
the left Auricle & ventricle take place
the pulse in the extremities ceases.
they become cold and rigid. the cerebral
the Tendinum approaches and every mark
of coming Dissolution

be the structure of these, or if they be possessed of any muscular power except in the large trunks near the heart. It therefore appears to be owned through partly by the power of the blood which is communicated from the heart and arteries, and partly by the contraction of the adjoining and incumbent muscles which compress the veins. But we find that these parts only in the muscular parts are supplied with valves which prevent the blood's returning by the arteries but allow it to proceed to the next unemptied.

CCXXV. The increase of the motion of the blood which takes place upon exercise shows how much the contraction of the muscles accelerates the motion, and the sensible effects of sloth and idleness although in the most idle people an artificial motion is kept going on.

CCXXVI. Hence the cause of many diseases

and

and the operation of the remedies for these is clearly pointed out. Hence it is obvious why quiet in all of the body is so necessary in most acute diseases; and why in other frequent exercise is the best remedy.

CCCCXVII. Lastly the motion of the blood through the Lungs cannot be performed without respiration, the reason of which will be seen in its proper place.

CCCCXVIII. The motion of the blood in the vicinity of the heart is most rapid, but in the smaller and remote branches of the arteries it is much slower: all kinds of friction is of service for this if it is occasioned by the tenacity of the blood itself, and its adhesion to the sides of the vessels, likewise from the weight of the detached particles and the imperfect elasticity of the arteries. But this proceeds most particularly from the decreased capacity of the arteries as they are divided into different branches (115). And all other causes for its being retarded manifestly

-ble

the Diameter; and it is equal to the whole difference of velocity which happens when there is no obstruction. For whatever velocity the blood receives from any other cause but this is restored to it by the contraction of the arteries.

CCCXXIX. For the same reason that the blood flows slower the further from the heart it is in the arteries; so in the veins the nearer it approaches to the heart its motion is the quicker. (115) But the motion of the blood is much slower in the veins than in the arteries, because all the veins taken together are nearly triple the capacity of the arteries.

CCCXXX. Lastly the weight of the blood has a considerable effect in retarding or accelerating its motion according to the posture of the body as it stands; and this is a circumstance of considerable importance in curing of preventing many diseases.

CCCXXXI. The arteries are terminated in various ways; being either reflected as in the veins into a like vessel as in the Dura and Cranium

of the blood; or they may be divided into so minute ramifications that they cannot admit the finest point of it; and are accompanied with veins for the same purpose: or lastly they may terminate in exhalants, excretory or in excretory vessels.

CCCCXXXII. The exhalants are vessels which from the thin part of the blood imbibe the watery vapours of the body, and these are supplied with large or small exhalants according to the size of the organ whether it be the abdomen thorax or head or the small cavities of the cellular substance all of which are kept moist by this means.

CCCCXXXIII. The excretory vessels are those by which the thinnest and most watery parts of the blood mixed with a small portion of animal oil and a good deal of phlogiston & the putrific acid are exhaled from the surface of the lungs and skin and the excretory vessels are those which

accompany

accompany the arteries in certain parts of the body and not only separate and point out certain parts of the blood, but they also change their parts and give them almost a new nature. But of these we will treat more fully when we come to speak of secretion & excretion.

CCCCXXXIV. The thinner parts of the blood which is poured into the arteries hollow organs of the body is again taken up, and conveyed back to the heart by means of what is called the absorbent or lymphatic vessels, which have their rise in almost every part of the body and excepting only the large blood vessels at last terminate in the receptacle of the chyle or thoracic duct which joins the subclavian vein. To this class of vessels belong those called lacteals which arise from the intestines and running through the mesentery are for the purpose of conveying the nourishment to the blood.

CCCCXXXV. All the absorbents both lymphatics and

and lacteals open into the cavities from which they arise or have been laid them and absorb their humours upon the same principle that the capillary attraction operates in vessels dry for we there is no force from behind to force the fluids into them; nor can they be filled by any artificial force applied to their cavities from the thoracic or intestines. The motion of the lymph & chyle is also aided by the muscular force and pressure of the fluids and the vessels containing them as before recited. And the return of these fluids is prevented by the numerous valves with which these vessels are filled.

CCCCXXXVI. This sort of vessels appear also to have a number of conglobate glands which they enter in their course and seem to form and discharge other matter into the blood vessels entering each of these glands from whence proceeds their irritation and sensibility and also their being liable to inflammation

matter. These glands are very numerous in some parts of the body particularly about the Mesentery axilla and in the groin.

CCCXXXVII. The uses of these organs as far as known is to form and round certain white particles which are repeatedly met with in the vessels carrying the red blood. They are frequently obstructed and swell to a great size from some acid substance being conveyed into them.

Chap. XV.

Of the circulation of the blood & its varieties and defects.

CCCCXXXVIII. The heart arteries veins absorbents and all the vessels which assist in the circulation of the blood are observed to be proportionally larger in youth than in more advanced age: and in the foetus they are larger in proportion to the size of the body than at any subsequent period: but early become less and many of them are then useless. Hence the body of the newborn child is pale of a red colour: and in youth it is soft, flexible moist & placid and fine coloured. In manhood it becomes harder and firmer and the countenance tanned and in old age it is rigid, dry, pale coloured and lean in flesh.

CCCCXXXIX In early life the veins are much denser firmer and stronger than the arteries. But hence on account of the pressure which they are always suffering and the force they daily exert when con-

tracting

424. Query may not the succeeding diameter of the veins as they approach the heart become less fast in producing the motion of the blood through them? It will obviously render it more easy for the wave of blood when it passes from the minute ramifications of the arteries into the corresponding small branches of the veins, will be moved through them with difficulty; as the capacity of the veins increases the resistance to its progress must become less for there will be more room for the passage of the wave and the diameter of the vein increases that is as it approaches the heart.

425 Although a moderate increase in the circulation of the blood augments the secretions particularly that of the skin, yet this has its limits beyond which it cannot go for we find in cases of topical or general inflammation as in fever when the motion of the blood is very much accelerated the skin becomes dry and hot: and the surest way of producing sweat is by moderating the rapidity of the blood: hence the use of refrigerants, bloodletting &c. (163)

430. Hence the propriety of an erect posture of the body in dropsy and an increased flow of blood towards the head: and of a recumbent posture in cases of fainting.

137 The swelling of a gland from becoming of
Mucle frequently proves very tedious and
severe complaint, and often they suppurate and
oft degenerate into cancerous and hobbesome
ulcers. Ointment of this are not with in venere-
al Buboes and it cures of the Marinus.

contracting become every day more hard and
firm and thus the arteries at last may exceed the veins
in their quantities. The reparable firm in old
age is part of the large exterior encreased into a
firm substance which at last becomes bone.

CCCXL. Hence in youth when the body is most bloody
the arteries and in advanced life must rupture
but this is an arrangement observing the econo-
mical action because it induces regular accumulation
& encrease and diminution of the body at two
main periods of life besides from this it is evi-
dent that whatever maladies may arise in the
early from a too great quantity of blood within
early life proceed from the arteries and at a
more advanced period from the veins, as is most
likely from such diseases. And this appears to
be the reason of certain diseases happening
at certain periods of life.

CCCXLI. Women & all other animals have the
heart & arteries most placid & veins compared with

with their veins, and the veins the arteries accompanies them. There is more. This is particularly conspicuous if we compare the aorta descendens with the vena cava descendens which corresponds with it. And this structure is made on purpose that they may be the better calculated for answering the latter. This likewise seems to be the reason why females are more apt to become corpulent than males. And this superior capacity of the veins to the veins is what produces the fine colour of the face in women; and likewise the fine round form of their arms in which the veins don't appear as in men.

CCCXLII. We likewise find the blood in a supple in different quantities to different parts, and to the same place at different periods of life. From the first formation of the rudiments of the foetus there is a great quantity of blood sent to the head because it ought to be the first place formed and intended to discharge its office; and accordingly the head attains its size sooner than any

other part

...ther part of the body. The increase and joining together, with the greater dilatation of the other parts about the blood vessels; and then the rest of the body begins to grow proportionally more than it did before: and certain organs which were before imperfect and undeveloped being at last completely formed and evolved become fit for performing their several functions.

CXLIII. The effects of the change in the course of the blood is observable in a very short time after birth because when none can pass by the umbilicus and a greater quantity is sent by the iliacs to the inferior extremities; and these now being more and longer in the latter state after proper supply than in those of six months. Circulation beginning when it first will though it cannot with propriety.

CXLIV. Physicians are wont to judge of the state of the circulation, from the Pulse: but it should seem it may vary both as to frequency and strength and equality of its beat, as well as

as in the length of the intervals.

CCCCLV. In a healthy adult the pulse beats about seventy times in a minute. In the foetus it is sometimes one third more frequent; in the first months of life it is seldom under one hundred and twenty; but in youth it becomes gradually slower, and in old age it is sometimes as low as fifty or less.

CCCCLVI. But in many people chiefly those of a very mobile habit, it is by some the pulse much quickened; while in others even in the flower of their age it is very slow. In women too it is rather more frequent than in men.

CCCCLVII. The Pulse becomes more frequent both in a healthy and diseased state when any stimulus is applied to the body. Thus exercise chiefly accelerates the pulse by quickening the return of the blood by the veins. The same effect is produced from various irritations affecting the nerves, anxiety or fretfulness of the mind, intense thinking, pain, heat, and diminishing the vigour of the circulation

and

and the like. Acrimonious substances dissolved in the blood are also said to quicken the pulse.

CCCXLVIII. In the morning when we rise the pulse is found to return quicker by degrees from the recumbent situation with which we meet, as from the taking in of food, particularly if it be an animal one, and fermented, and in the evening there is a species of febrile pulse which attends on the digestive process. But in the healthy state of the body neither of these causes are the proper remedies. But in the healthy state of the body perceptible, but in the sick, and particularly those affected with hectic fever it is very manifest.

CCCXLIX. Lastly, debility itself makes the pulse frequent; because when the ventricles of the heart are not properly emptied, they are quickly filled again, and stimulated to contract above their usual pace. For a Physician judges of the impetus of the blood from the frequency of the Pulse.

CCCL. In all fevers however different they may be from one another, the pulse is universally quicker than in the healthy state, from the debility, and

spasm

partly from the acrimony of the humours and partly from the blood being repelled from the surface of the body, and accumulating in the great vessels about the heart abdomen &c. But in this last particular we must confess our ignorance: for in one case only have we had information of the body after death, and in that the greatest care of the pulse did not discover it.

CCCLI. The pulse is often changed by the mind: for it is in the power of sensible persons instantly to raise the pulse; or from compression or some affection of the brain. But when compression is the cause it usually occasions a great irregularity of the pulse as we find in hydrocephalus or dropsy of the brain. Sometimes the pulse is found to be very slow in patients recovering from a long fever: but this does not appear to be a circumstance of great importance; and it seems to proceed from some degree of stupidity.

CCCLII. Although the quickness of the pulse be not

altered. They may become full, large, powerful, strong and hard; or they may be weak, feeble and slight. The pulse becomes full, large and strong when the ventricles of the heart empty themselves fully and expeditiously; so as to send a great volume of blood into the artery; by which means it being suddenly distended is stimulated to a powerful contraction. A pulse of this kind is commonly met with in strong men well advanced in life & is usually considered as indicating a disease. It is said to be hard when it strikes the finger strongly and sharply. And the hardness of the pulse proceeds from a violent contraction of the ventricle and the more remote branches of the arteries or those in the wrists which by their smallness are incited to a violent and sudden action. Hence a hard pulse excites a vigorous action of the heart and arteries.

XXXIII. That they may preside over animal secretion; which is one of the great beauties of the arteries which may arise from their being not only capable thereby more perfectly to perform (318)

(41, 20)

lips, &c. It may also proceed from too dense a state of the solids; hence it is most common in cold & bilious regions, and in robust men accustomed to labour (86. 89). It may also arise from a certain irritation when applied to the whole or some one only affecting the head and chest. The species of fever which is known by the name of Peach's disorder seems to commence with inflammation when in this it proceeds on the surface of the whole body; whilst by degrees of cold to the whole body. Such a state of the circulation as is indicated by this kind of fever bleeding, and bleeding well

CCCLV. When the fever is accompanied with profuse sweats from a contrary cause; and indicates a contrary state of the system and circulation; it is cured by stimulants and cordials, & bracing by degrees every depletion. In some instances a fever of this sort is met with even when there are no

longer any symptoms of inflammation in the bowels

and

hit. It is perhaps from this circumstance that bloodletting is already much better adapted to youth and manhood than to infancy or old age.

151. It is no doubt owing to this strange and singular distribution of the seat of the headache that they of all other animals are known have the menstrual flux.

153. It may be observed that in every case of inflammation we do not meet with a state of the description (as Enteritis (inflammation of the bowels) is always accompanied with a weak feeble pulse similar to that of Typhus fever. This perhaps arises from the intimate connection existing between the bowels and nervous system or Brain; as is indicated by the vomiting which attends compression of the brain.

and intervals. Must in these and all other examples we must be chiefly guided by the nature of the malady than the state of the pulse.

CCCLX. An intermittent pulse is when the artery at intervals seems to stop the height of which is usually in between the beats some of the beats and in all cases when they contract at the common period.

CCCLXI. That sort of pulse is natural to some and we find it in some men who enjoy the best health and in such men the pulse be comes regular when they are in a perfect state and does not return to its intermittent state till the disease has left them.

CCCLXII. There are likewise men who have the pulse perfectly regular when they are in a state of ill health but when affected with the slightest disorder it becomes intermittent. There are also other symptoms particularly those of a very irritable temperament as by nervous and hysterical persons or those subject

subject to diseases in the digestive organs; whose pulse will become intermittent from very slight disorders in the bowels, or from any unusual affection of the mind, and sometimes from causes so slight that they cannot be discovered: and they will learn themselves to be in this state without examining the pulse from the anxiety occasioned by weighing with what they get in the breast from the failure of the pulse.

CCCCLVIII. Physicians meet with an intermittent pulse in some disorders of the breast or in hypochondriacs; and in all disorders particularly in fevers when the patient's strength begins to fail and death is approaching. In which cases it is always to be considered as a fatal symptom and the forerunner of death.

CCCCLIX. Therefore from what has been said we consider that want of pulse as proceeding from an unequal influx of the nervous energy in to the heart and other organs connected with the

circulation

circulation; but in these last it is of little importance; or it arises from the nerves proper to the stomach or adjacent, and thereby rendering the part less fit for contracting properly, it cannot empty itself completely, unless it be more than usually distended. Lastly this kind of pain may proceed from some defect about the head of its organs, as from tumors, water springing upon it and impeding its action, which is of most in all cases a fatal circumstance.

CCIX. Physicians have described many other varieties of the pulse; and have imagined that the species of the diseases might be judged from these: but these are only known to the authors of them. Nor we have as yet never been able to discover by our own observations at least in this country that such predictions can be sufficiently relied upon. Neither the authors themselves assigned proper causes for the different appearances the pulse assumes, nor

in

is it known what state of the circulation these different pulses indicate.

CCCLXI. The motion of the blood may be too quick, or too slow, or it may be altogether stopped.

CCCLXII. The cause of a too quick motion of the blood is easily known from what was said (447, 453). A full pulse or strong pulses will make the circulation quicker, because the greater the resistance on the inside of the arteries the blood be projected into the arteries; and by thus increasing their tone, thus their action will be likewise accelerated. But when the pulse is large and strong or pulses it increases the motion of the blood. Hence we see the various causes which induce both these sorts of pulse, either acting together or separately will induce both change in the circulation; and hence we consider it as arising from exercise, heat, stimulants, fullness, all kinds of irritation, pain, emotions of the mind, fever.

CCCLXIII. A too great impetus in the circulation dilates the vessels, excites the whole body, heats and

and circulates it, increases the heat but it does the other secretions; indeed and disturbs all the functions both of body and mind. it likewise increases the nutrition; consumes the vital and powers prematurely. Hence great quickness of the motion of the blood & pulse denotes the fever to be, from which proceeds efficient & remote causes. ... But it ought to be observed that although an increased motion of the blood is in some cases beneficial; in others it is not, at least or that motion which produces depletion in many diseases.

CCCLXIV. The motion of the blood frequently is sometimes too slow; and this proceeds from debility, rapidity, or from a want of irritation or exercise, and when the powers fail; & are not or cannot be repaired as they ought to be. The circulation of the humours may also become too slow, from obstruction or opening in the vessels so as to impede their motion or render it difficult.

CCCLXV. In the same manner the motion of the blood

blood may impede its motion, as when people by standing long upon their feet prevent its return from the lower extremities. Any deficiency about the heart or arteries will produce the same effect, as these being enlarged, contracted or diseased will have the same thing in a greater or less degree. Diseases of obstruction in the veins, or of difficult respiration by which the passage of the blood from the lungs to the heart is impeded.

CCCLXVI. Whatever causes the circulation of the blood may be called the defect is chiefly conspicuous in the veins, because in these its motion is always slow (429). Hence we meet with dilatations of the veins and congestions of blood most frequently in those parts where there are fewest valves in the veins, and where the action of the muscles has least effect in promoting the circulation.

CCCLXVII. It is from the same cause that dropsy is often induced by a slow or impeded motion of the blood; because the efforts of the veins

being

being increased the blood is less easily received into them from the arteries, and a greater effusion of thin humour is produced (432) which being of ... in these vessels is not sufficiently taken up by the absorbent vessels

CCCLXVIII. Local inflammations are also ... from a too rapid motion of the blood & are very difficult to cure, because there is generally a ... of all the powers of nature. Mortifications ... proceed from an increased quickness of the blood are never terminated either by death or in a perfect cure.

CCCLXIX. But the most common defect in the circulation is when the blood is carried more rapidly or with a greater force to one place than ... then; and which will produce a corresponding defect of it in another.

CCCLXX. Such an unnatural distribution of the vital fluid often proceeds from one disorder being ... by some great predisposition to disease from

from

from the part affected, as the Skin for instance for the purpose of nourishment of the animal; which will occasion a certain and definite distribution of the blood to the part according to the known laws of the circulation. (§. 52. 360.)

CCCCLXXI. It also increases the quantity of the blood by which will promote the nourishment of the whole.

CCCCLXXII. The diseases which arise from this unnatural distribution of the blood will be in proportion to its plenitude both in magnitude and danger. They are heat, swelling, redness, inflammation, laceration of the vessels, and hæmorrhagies, vitiated effusions and destruction of the cellular substance and neighbouring parts from corruption and suppuration.

CCCCLXXIII. These diseases and alterations from their first appearance are often successfully cured by nature as the best remedies. And Physicians have often thought it proper to second her efforts by using every means to change and regulate the distribution of the blood in many

457. I remember Dr Gregory mentioning in his Lectures upon the Practice of Physic that the late Dr Cullen always found that his pulse became intermitting before he had any attack of a Diarrhoea: and that this irregularity of the pulse was the first indication of its coming on.

in many diseases, nor have they neglected of the practice. For they have found by experience that a change of the circulation when properly made is the best remedy for curing many diseases, and for increasing some of them worst symptoms.

CCCLXXIV. Lastly the arteries & the muscles are objects of the attention of Physicians, there are palpitation and fainting.

CCCLXXV. Palpitation is defined a violent and irregular motion of the heart, & and it is only a sensation of what people call anxiety & the patients, but in reality it is obvious to spectators if they apply the hands to the heart; and sometimes it strikes the ides with such force that the whole breast appears to the sight to be moved. In fact the heart palpitates the pulsation of the arteries is commonly much increased & intermitting.

CCCLXXVI. This disease like a spasm is induced by

by various causes; both seem to affect the heart itself or such as affect the whole nervous energy. All kinds of defect in the organ itself, its valves or vessels; or enlargement, contraction or stiffening of these, also polypus, or whatever by impeding the action of the heart invites it to violent and unnatural contraction will produce this disease. Too great a quantity of blood or too great an impetus in it is also said to produce the same effect

CCCLXXVII. But as the heart is an organ by nature endowed with great mobility; if that be increased by any affection of the nervous energy it will produce palpitation. Hence we find it induced by affections of the mind, and very common in hysterical people.

CCCLXXVIII. Pain frequently proceeds from some cause in the digestive food, burning crude or acrimonious in the intestines; or from these being distended, stimulated or loaded by acrid matters or air

generated

exhausted during deglutition.

CCCLXXIX. It is often found accompanying the epilepsy where it preceds or not properly stated whether it proceeds from debility whatever may be the cause of it; or it may arise from any part of the difficulty in breathing: for in most cases of suffocation may be found convulsions or the cause inducing the other.

CCCLXXX. Hence we may see the reason of this symptom being in some cases incurable and soon proving fatal during its paroxysm; and in others being slight and very transitory; and only it often continues for long intervals; and lastly why in some people it is brought on and increased by any irritation and exercise; and in others exercise and stimulating medicines give the only relief

CCCLXXXI Syncope (fainting) in speaking of this disease physicians have usually had recourse to according as it is a slight disease or otherwise it is said to happen when the action of the heart and

and anteriors fall so very low as to deaden the animal powers, and the circulation and voluntary motion also sink away.

CCCLXXXII. All those causes which produce faintings will also induce syncope; because whatever is able to disturb or destroy the motion of the heart can also debilitate or suspend their altogether.

CCCLXXXIII. Hence fainting is produced by any defect in the structure of the heart, or by irritated fretfulness of the mind either exciting or depressing it; by all the different defects of the nervous energy; by certain diseases of the bowels, all sorts of debility and all kinds of depletion chiefly by bleeding; by long continued and hard labour; watching; by heat, pain and the action of many poisons.

CCCLXXXIV. Whatever cause renders the motion of the blood through the vessels of the heart too slow will produce syncope; and whatever accelerates the blood will restore the patient.

after

after the hero faints.

CCCLXXXV. Hence the reason is obvious why the position of the body has so much effect in producing or removing Syncope.

CCCLXXXVI. It is also manifest that Syncope and Asphyxia are not diseases of themselves but only symptoms of other diseases & that by any means deranging the economy & interrupting the circulation of the blood through the brain, either Syncope or Asphyxia may be produced. Artificially by a bandage tightly drawn round the neck, & Fatally by hanging. Natural by any disease which prevents the free circulation of the blood through the brain.

Chap XV.

Chap XVI.

Of the nature of the blood and its varieties and defects.

CCCLXXXVII The blood itself, which is a fluid so necessary to animal life is by no means simple, nor is it always the same. On the contrary it is composed of different parts which are in their several degrees, and it is likewise liable to many varieties & defects.

CCCLXXXVIII If we examine it attentively when it is drawn from a vein into a proper vessel it is seen to manifest its nature and composition while undergoing its spontaneous changes.

CCCLXXXIX First, it exhales a thin serous fluid of a saline nature and slightly impregnated with oily substance; by letting it rest in the cold air it soon coagulates into a dark red mass of a tremulous appearance and now left in the course of a little more time there appears

appear a humour in the form of small yellowish
pellucid drops upon the surface of this mass: which
their appearance is accelerated by melting the
mass: these drops diffusing themselves after
collected and form around the mass a separating
from the sides of the vessel.

CCCXC. The thicker part which alone is gained col
as when properly examined shows the contents
to be of the most. It contains much of the humour
in which is called the albumen and when
it is well washed it leaves the colouring and
gluey matter of a yellowish appear-
ance. This part is known immediately
from by the different nature of fibre of the blood
for coagulable lymph and the gluten.

CCCXCI. The Crassamentum which part contains
besides this substance a number of red particles
commonly called globules which communicate
the red colour to the whole blood. These globules
have with a microscope been found each of these
found to be a beautiful sphere which is differ-
ent

different in different animals.

CCCXCII. In man and most other animals they are of a round shape and like a piece of coin. The matter just of them which is called the blood, is contained in a double bag or pericle, containing a subtle ichor in it and some smaller than itself,

CCCXCIII. Upon opening the thin part or membrane of the blood is a proper degree of heat it coagulates in a little time after coagulable upon standing that which was found upon the coagulum of a preternatural coagulation. How this again there is a thin watery like blood may be expressed.

CCCXCIV. The blood likewise contains a great portion of water and saline matter such as will found in the urine. But the principle part which it contains in the blood is of a peculiar nature and totally dissimilar to that which are met with in plants and fossile bodies. What part of it is alkaline being the volatile alkali and what

with the acid in the phosphoric acid.

CCCXCV. The whole blood when drawn from a vein may be coagulated by a much less heat than that which is sufficient to coagulate the serum alone: but in both cases the heat must be stronger than can happen in the human body, when alive.

CCCXCVI. The red particles of the blood float properly when very perfectly whole floating in the serum as any other fluid in which a precipitation of salts have been dissolved. But if it be diluted with water their external surfaces become smooth and assume the shape of a globe, like that of the serum and all the red particles perish, are resigned to dissolving the whole mass of the blood, and to keeping it in a proper state of fluidity; and also for keeping the red particles whole and in their proper figure.

CCCXCVII.

CCCXCVII. The origin, termination and use of the red particles appear to be all buried in uncertainty and obscurity. Some have imagined that the central particles are formed in the spleen, the Thymus gland, and afterwards by the conglobate glands of the mesenteric vessels and are carried to the different organs of the body; hence the spleen by which they are collected with their colour and coagulum; and believe that it is resorbed into vessels and conveyed to the heart.

CCCXCVIII. It has not however been doubted that particles formed with so great care and so convenient for some important purpose in the body although their use is not yet known. Hence been suspected to contribute to the exercising the animal heat: but we have no sufficient reason for thinking that this is their use. Blood, bile and urine the larger vessels but seem

even

enter the smaller ones: so that they cannot easily
part with the body. They appear to circulate
in a great degree between the body for they
are found most abundant in such animals
as are well fed: and in such as are starved
or emaciated they are always least numerous.

CCCCXCIX. The gluten is also serviceable in distending
and filling the large vessels: and prevents the
vital fluid from running out: for a thin fluid
without gluten could never be sufficient for the various
purposes of life because it could not be retained
in the larger vessels which are so full of pores
and outlets. The gluten seems chiefly designed
for nourishing the body, and it is well adapted
for this purpose because it contains a great
deal of nutritious matter: and all sorts of food by
a double digestion in the body are converted into
gluten which does nourish it and repair
the loss of the solids.

Or

D. The various uses of the whole mass of blood are subjects of the greatest importance: for in the first place with out distribution it excites the nervous energy; generates the animal heat and diffuses it through the whole body: and besides the blood is the source from whence the various humours are secreted and depart. for their various purposes

DI. The different parts of the blood which we have mentioned are seldom found mixing with it; and it is now to be met with many other substances. But in the coagulum we find the gluten with a portion of the blood which when it does not coagulate but the red particles fall to the bottom of the vessel like sand. and thus it is most easily procured by itself.

DII. The serum is sometimes found of a white

colour

colour like milk; which proceeds from a part of the fat being absorbed by it and not converted into gluten. We likewise find it sometimes of a yellow colour from the bile being diffused in the blood.

DIII In some cases the blood is unnaturally coagulated when in others and the crassamentum appears covered with a tough white crust like leather. This crust is nothing but pure gluten which being slowly coagulated, the red colouring particles fall to the bottom in a certain degree.

DIV This does not indicate any heat, or suddenness of coagulation in the blood as was long thought to be the case; but rather an unusual sluggishness in its coagulating. It appears to proceed from an increase of the agitation and shaking of the blood in the body. Hence it is a symptom accompanying many fevers and diseases of inflammation; and sometimes it is found in cases of haemorrhagy and fevers are

accompanied with cutaneous eruptions: it is also met with in the body is phlegmonously inflamed as in cases of severe pain and all other irritations. But the appearance of this crust is not in all cases to be deemed a morbid symptom because it is sometimes found in people in perfect health; as in women during pregnancy & about the first months: & in some strong laborious men: and in all who live richly; it is most frequently met with during the spring and autumn seasons, at which times the action and strength of the blood vessels is most powerful (462) It may likewise be induced by very slight causes while the blood is drawing off: as from the mode of receiving it into the vessel or the figure of the vessel itself: hence we sometimes meet with it very perfectly in one cup and not in another although they have been

both

both filled at the same time.

DV. But in all cases where this crust appears we conclude that blood letting is requisite and that the patient bears it well no from experience: but from what has been said we may see the danger of the practice which some have adopted, namely, to repeat the bleeding till the crust disappears because the sup. poses it to be the membrane of the blood. But when the whole it is a most useless sign to a medical man although he ought not to allow to it alone.

DVI. In some cases during life but most frequently after death the gluten itself collects into a thick matter termed a Polypus in the large vessels about the heart or in the heart itself; and this is produced by any decrease of the organ or its vessels or from enlargement or contraction. Similar masses

or in

are often met with in the Urine and in these cases they are termed Nodes.

DVII. The exact quantity of the blood now in each of its constituent parts is not easily ascertained to measure. ... But it may vary considerably in quantity when it is in a perfectly sound state; and when there is too much or too little blood in the body, or when the proportion of either of its component parts is altered it produces a defect of considerable magnitude and may be the cause of many very severe disorders.

DVIII. A preternaturdance of blood is produced by a too plentiful use of strong fat food particularly if it be of the animal kind, and strong drink, but only in cases where digestion is properly performed) and by an idle and sedentary life especially in those who have been in the habit of taking much exercise. It likewise produces by the suppression of accustomed evacuations and

by

501. This occurs in cases of great debility as in Typhus fever or when there is a tendency to putrescency: and as it appears to be the reverse of that state of the blood in which the Buffy coat appears it always indicates the impropriety of bloodletting or depletions of any sort. The danger of this state has been remarked by the vulgar who when the blood appears this appearance they say the Coffin is in the bottom of the cup.

502. The Chemical Test in some cases will detect a resemblance between the urine and serum of the blood for in Diabetes Mellitus it is that of a sweetish taste & strongly impregnated with saccharine matter.

505. This state of the blood known by the name of the buff, will sometimes appear when the body is considerably debilitated as in the last stage of Phthisis Pulmonalis and in Dropsy. From which last it is evident that it is not always proper to bleed when the blood assumes this appearance; but it may be remarked in general that in all fevers bloodletting is safe and proper if the blood dravon assume this appearance.

507. A deminution in the quantity of blood produces wasting & nervous disorders. From an excess of it proceeds plethora and all this diseases arising from it. Spontaneous haemorhagies &c. When the blood is too thin from an excess of vernum diathesical swelling and a soft habit of body comes on. And Inflammations of various kinds arise most probably from an encreased density of the blood.

Fat. In apoplexy a considerable discharge of blood from the [illegible] suppression of usual evacuations is most frequently met with in people who have been subject to the Hæmorrhoidal (piles) and where that discharge has been stopped. such people frequently die of Apoplexy or other complaints proceeding from Plethora. the other instance of an increased quantity of blood is often met with in those people who have been in the habit of frequent bloodletting or in females who have suffered much from abortions, hence we find them often get very corpulent.

by habitual evacuations of what ever kind they may be; chiefly by those which diminish the vital power and render the circulation languid; by which the circulation through the skin is gradually opened and the insensible perspiration is most commonly the people of a lax and debilitated constitution.

XIX. Many Maladies have their origin from too much blood. In some cases the fluids are impoverished and become dull, languid and viscid by owing to the organs which move the blood being incapable to propell its weight. The pulse turns languid and in some, imperfect, intermitting palpitation comes on. In some cases the vessels being preternaturally distended are apt to pass into very violent and unnatural actions.

XX. Hence the predisposition of such people to fevers, inflammations and incapacity of distributions of the blood; also to unnatural congestions

Lacerations of the vessels and strangulations proceed from the constriction of the brain between its vessels and the fragments of the neighbouring bones we also find an increased mobility and a disposition to spasms and other disorders of that kind proceeding from the same cause in these cases.

DXI. And hence the reason why so great debility is sometimes accompanied with an obstruction, and sometimes with a disordering one: and why in some people it is a cause and a symptom of so many disorders and in others no effect of health. From these we see how it can be best removed, either by applying evacuations or by procuring stools if required, and by using a thin spare diet and taking frequent and strengthening cordials.

DXII. Physicians have imagined that they have discovered other species of debility perfectly different from their true kind, and they have

have occasioned a great deal to form their existance but often with more fictitity than correctness.

DXIII The first of these sorts of fulness is what is termed fulness with regard to space which is said to happen when neither the quantity nor weight of the blood is increased, but the vessels which contain it are so constricted and pressed together that they can not contain the usual quantity of blood without difficulty. This is observed in the constriction which happens in the extreme vessels upon the attack of a fever, or in cases of sudden terror and of great cold; or the minute vessels may become constricted and inflammation as happens in old men. Lastly this species of fulness may happen from some of the members being amputated or otherwise mutilated.

DXIV The next sort is spurious fulness with regard to capacity; it happens when the quantity of the blood is not increased, but it is expanded from an augmentation of its [illegible]; and produces a distention

tion of the respiration proceed from what occurs in the two species of pulse. This defect is produced by any great heat of spirit, generally or particular, or excessive or from the application of stimulants. It is caused by the blood becoming preternaturally acid and the fibres relaxed. Hence it may happen from an unnatural and sudden diminution of the specific gravity of the air as occurs in sudden changes of temperature, or when men ascend very high mountains where it is thought the blood is assisted by the expansion of the air. It is doubtful if this can happen from an increase of the impetus of the blood as Boerhaave the opinion of some blue reasoning mathematicians who supposed that its bulk was increased when its force was accelerated (443, 453. 462.) as from heat or violent exercise or other stimulants.

DXV. Pulse with regard to strength is such pulse when the blood is in a great quantity that a

that it affects the moving powers [illegible] [illegible]
but is always proportioned to that defect and therefore it
may always be said to be with regard to strength
but a defect of that kind frequently happens, even
in very small degrees of blood, as in the case of those
men when they are tired and their strength is broken
down other causes.

DXVI. From what has been said it is obvious
that the various kinds of debility may occur in
the same person at one time; and that such a
combination will make the disease more severe and
give it a tendency to advance hazardously.

DXVII. When an [illegible] proceed, from a de-
ficiency of blood; it debilitates the patient, more
or less, incapable of discharging many of the
functions of life; and in such cases the motion
of the blood becomes languid and syncope, coma
and death supervenes. If the deficiency is
small and long continued the body becomes
from a want of nourishment, and all its func-

tions

bours are situated in various ways.

DXVIII. A deficiency of blood proceeds from long fasting and spare food containing little nourishment, or even when the food is good but ill digested, or if the nourishment which is prepared from it be prevented from entering the blood; as from fevers and other disorders which exhaust the body and prevent it's being nourished so lastly a deficiency of blood may proceed from various evacuations chiefly blood letting if performed suddenly; for when it is done slowly the body can accommodate itself to it in a wonderful manner. Besides when the evacuation is made slowly the evacuations are opposed by the vital power becoming deficient so that the retention is the same; and if this means any unusual evacuation is easily effected at least in part. But if the repletion is sudden and to any great extent it may produce death, or the patient may be so weakened that he can never recover it.

DXIX. By any long continued or great effect of the blood

the blood the humours of it seldom escape being vitiated: because the impurities are easily and quickly replenished, but the loss of the globules and other particles is not so soon repaired. Hence the blood loses its crassitude and does not coagulate properly nor does it supply the body with sufficient nourishment.

DXX The blood is also much altered by a too free use of spirituous liquors particularly if it be of a watery sort, and by eating food which is ill digested & not well nourish the body and is ill prepared both in the bowels and stomach, from which there arises acrid humours which pervade the whole mass of the blood. The usual secretions of urine and perspiration are also changed as in the case in colds and defects of these parts: and the whole body becomes predisposed and disordered from a vitiated state of the humours. But in such cases as these there are generally other causes existing besides in the blood itself.

DXXI

DXXI. When the blood is too thin or watery the countenance is pale and the body weak, languid and torpid, the pulses are relaxed and flaccid from want of sufficient, and from their being overspread by abundance of moisture in the fauces (80,86) effused and watery secretions happen in every part of the body. because the exhalation of the humours which bedew all the hollow organs of the body is encreased, partly from the blood itself being too fluid and thereby needlessly running out, and partly from the vessels being relaxed and unfit for retaining it. And in this case the distended vessels are so, for from being upon much as they usually do, these they likewise participate in the general debility and are less fit to distribute their functions than at other times.

DXXII. But we find that nature has established the most simple and effectual method for pre-

513 When the blood is from any cause whatever, repelled from or stopped in its passage toward any part of the body, it must be regurgitate back again and proceed to some other part which will consequently produce a fullness or superabundance of blood in that part. This forms fullness with regard to space.

514. This species of fulness often attains to such a height that ruptures of the blood vessels ensue, hence haemorrhages in fevers, and hence the bleeding from the nose and eyes and the Finnitus aurium which attacks aeronauts when in the higher regions of the atmosphere.

515. This species of fulness is met with in cases of females, when Pregnant, especially those who have been liable to abortions. Many of whom I have known to feel no motion of the fœtus for some days until they had been bled. when it

it would again become perceptible.

preventing these inconveniences and guarding it in; so that the blood does not become immaterial by this as readily as may have imagined; and even in cases where it does become so any remedies provided for it by nature. For as soon as the body is restored to health the exhalations of the urine perspiration encreased so that the whole mass of blood is soon restored to its usual equability.

DXXIII. Medical men have imagined that there is another defect in the blood called the want of this; and that it may become too thick; but we seldom meet with examples of this such a defect is supposed to proceed from too free use of any kind, glutinous viscid food, or from a defect of drink; or an excess of the watery secretions as from heat or exercise &c. But to prevent this disease are very many or of a supposed disorder proceeding from it. For such persons diet

and inflammations as are bred & procreated there, are plainly referable to other causes.

DXXIV. It seems to be an established law of nature that as soon as the blood is carried to its proper bulk or any little more, the urinary secretions are diminished and suppressed, and the body imbibes more moisture from the atmosphere; the thirst is also excited and the patient drinks as much as is necessary for diluting the blood properly. And when the watery part is separated and the mineral salts appear in a proper quantity, the morning secretion is restored by drinking what is necessary; the blood instead of turning thick becomes fluid, transparent and dissolved, and remains so until the return of the same causes by which it became thick in the first place.

DXXV. Medical authors have wrote a great deal upon the acrimony of the blood; and have endeavoured to build an extensive theory upon that slender foundation.

DXXVI. But it is a truth known to all that the blood is not

all times a sweet and acid taste; and if medicines it may become the more so from various causes and in such cases it will give rise to many serious ills. This state of it is indicated by an increased action of the heart and arteries or of the secretory vessels from acrid substances being carried in them; as is seen from the increased acrimony of the secreted humours which act as powerful stimulants upon the vessels and in some cases plainly excite them.

DXXVII. We find that there are a number of acrid substances easily enter the body, but they are changed digested and altered in their nature before they enter the blood in their passage through the stomach and intestines, or by being mixed with water, gluten, oil and Phlogiston they are blunted and deprived of their acrimony or are carefully expelled from the body or subdued but not so

DXXVIII.

DXXVIII. By this means a great quantity of acid salts neutralized by alkaline ones may pass through the body without being in any degree injurious to health. But if the quantity of either be too large or not properly diluted or incorporated they will be hurtful.

DXXIX. During the time a man lives putrefaction is going on; by which means a great portion of a particular salt called animal salt (Hg) are generated and set at liberty; and a great portion of the saline substances which enter the body are converted into this and expelled with the urine. But if this tendency to putrescency is too great, a greater portion of this salt will be generated; and this will be increased if the patient takes much animal saline food & does not drink a sufficient quantity of water to dilute and expel it from the body. Which

species

species of disorder to which consumptive persons are
subject particularly if they have been living upon
such provisions.

DXXX. But nature has provided a remedy for
this sort of putrescency which corrupts the body
of milk namely, by a supply of fresh food abounding
in juices of an acid nature and containing
plenty of nitrous air which they communicate
to the body.

DXXXI. But in cases where such assistance is
not used, the body is very liable to become putrid
and a great acrimony and thinness is generated
in the humours; especially if the watery parts
wanting, or if the excretions which carry the pu-
trid substances out of the body become languid
as in the case in colds, or in slothful habits
from torpidity; and in depressing affections
of the mind, or where the strength of the body
is broken by disease; and lastly when the heat

or

unusually increased which also always accelerates putrifaction.

DXXXII. Besides the humours in some cases appear to be uncommonly prone to putrescency; from a seed of putrid ferment being received into the body: as in certain contagious fevers where it is increased chiefly by the heat, the use of animal food and certain salts and likewise by debility and sickliness.

DXXXIII. Lastly in some instances, particular parts of the body may become putrescent from various causes as from inflammation gangrene or intense cold: and by these parts the whole body may be affected: although most generally the disease produces death before it extends through the whole frame.

DXXXIV. But when the whole mass of the blood becomes putrid it not only turns acrid but it likewise dissolved and becomes diffluent

to

& coagulate, so that the crop or buffy coat
thus made from the red particles are
dilated and broken when the blood is in
this state it turns acrid from the quantity
of salts which are evolved; and its globules
becoming rancid and putrid stimulate the
vessels and corrodes them so that it runs out
of them; and first forms the spots, and then
the black eruptions, swellings and ulcers which
are very difficult to heal unless it happens in
the winter season? Hæmorrhagies also break
out in every part of the body which are very
difficult to suppress. a specific putrescent in-
tolerable stench arises from all the excretions
this is accompanied with a great lassitude
debility of the solids, pain in the nerves being ac-
cited with the poison) till at last the corrup-
tion produces death.

DXXXV. An acid acrimony is never met with
in

in the human blood; nor in any of the humours secreted from it, except the milk which becomes spontaneously acid in a very short time.

DXXXVI. Neither does the blood ever appear to be affected with an alkaline acrimony. But recently incoagulable urine tends to this state, and is soon converted into it; but this hardly ever happens during life; although the urine even when recently voided approaches very near to the nature of an alkali.

DXXXVII. There may be various sorts of acrimonious substances in the blood which may proceed from a too liberal use of acrid matters, as from a muriatic or fermented drink; but of the nature of these we are quite ignorant.

DXXXVIII But there are various sorts of acrimonious diseases which sometimes attack the body and corrupt it under the form of acrid humours & disorders; as the small pox, measles, &c.

530. It is upon the principle of Mephitic air correcting Putrescency that Yeast is found so beneficial in Putrid fevers of a Typhus nature, and not from its sedative nature in counteracting the reaction as some authors have supposed. This is proved from the effects of Yeast being aided by the exhibition of other stimulants as Wine &c.

538. The greater number of those diseases which terminate in a state of Putrescency are preceded by, or commence with an increased action of the blood vessels and a preternatural quickness of the circulation. Hence we may consider this overaction as a cause of Putrefaction or as producing that state of the fluids which constitutes putrescency.

138 Examples of the provident care of nature are also conspicuous in the alterations produced in the senses when the body labours under diseases tending to putrescency: for we not only find the desire for drink encreased but we also find a peculiar desire for acid drinks and food, with an aversion to flesh or animal food of all kinds which has the effect of aiding putrescency.

The new actions and outlets nature finds for the acrimonious particles in these cases are seen in the various kinds of cutaneous eruptions and in the copious perspirations or diarrhoea which occurs in some of these complaints.

causes, the manner & procedure of the natural energy, and mode of action in which are but little known, although their effects are perfectly conspicuous.

DXXXIX But nature is hardly provided against the baneful effects of many of these acrimonies with as much care as she has provided against the thickening of the blood; in some cases an antidote is provided by exciting thirst as with the drinking copiously they may be diluted or by increasing the excretions they may be thrown off; or lastly nature sometimes excites new motions and actions, by which they are overcome, changed or rendered perfectly innocent; or they may be expelled from the body by new & unusual roads and excretions.

DXL.

DXLI.

PLATE II

PLATE III

PLATE IV

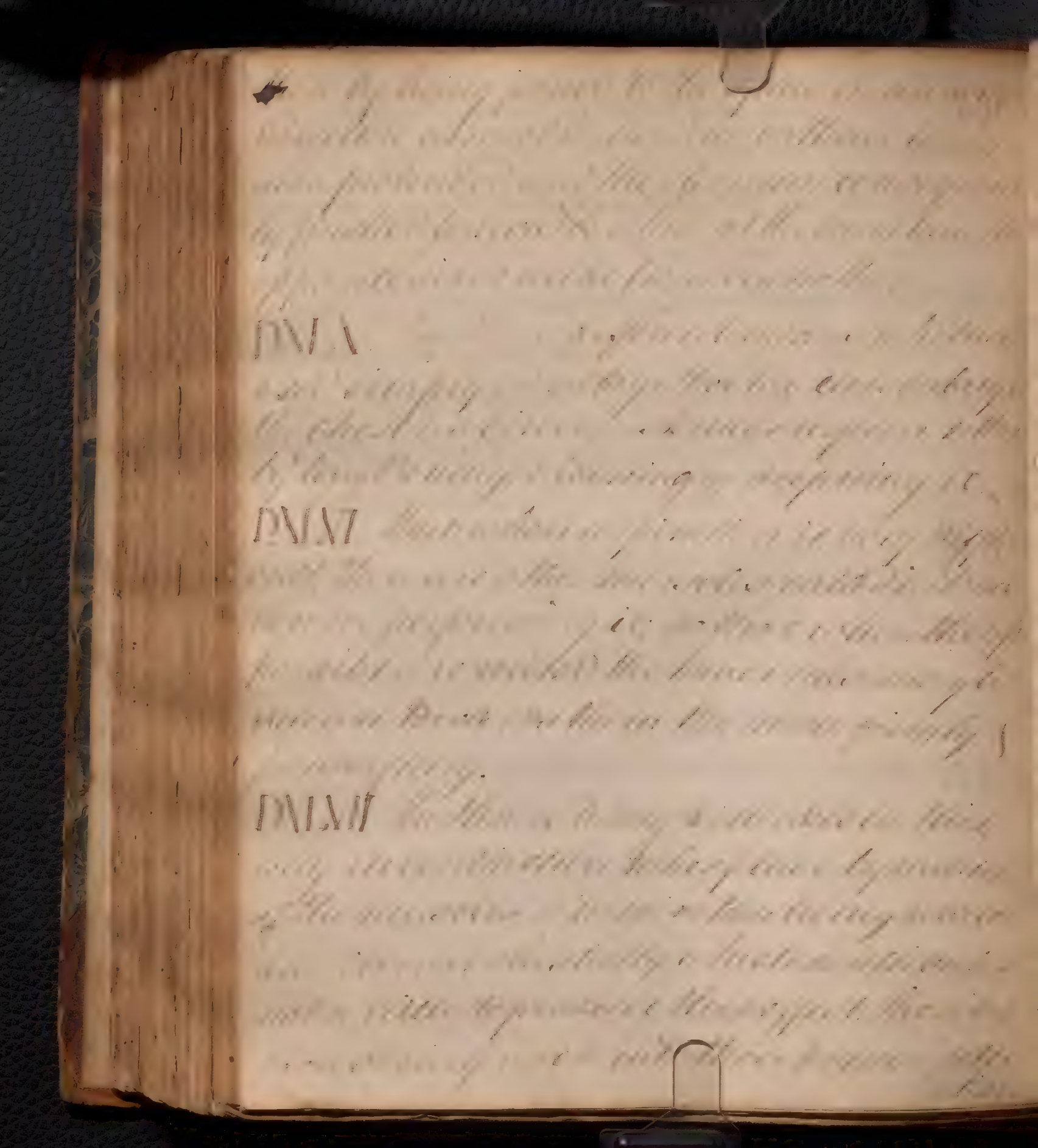


PLATE VIII

DXLIX.

DX.

559. Some have maintained that the first breath we draw is owing to the stimulus of the atmospheric air upon the sides and breast. But one great objection to this is our first breath being an inspiration. When a stimulus is applied to a muscle it contracts, but the contraction of the muscles of respiration produce a diminution in the capacity of the chest which occasions an expiration. hence our first breath ought to be an expiration which is contrary to fact.

DLX.

DLXI.

DLXII

555. Query may not the stimulus of the air when rushing into the lungs & distending the air vessels act as a propelling power to empty the blood vessels?

562. Or we may rather say if the animal heat (as some maintain) be owing to the absorption of oxygen in the lungs) the quicker animals vitiate the air in respiration the hotter blooded they will be.

DLXVII.

PLATE

DLXXV.

573. The different sounds or modulations of the voice are performed by dilatations & contractions in the glottis and by different ~~modes~~ positions in the muscles of the lips, tongue, nose & palat. We cannot therefore but admire that great mechanist who has enabled some of the feathered songsters of the Forrest to produce so many varieties of sound by separate degrees of contraction in an orifice so small as the glottis of some of them.

DLXXVII

DLXXVIII

DLXXIX

DLXVI.

when it be due it is necessary to explain
the principles that are employed in it
and it is generally understood.

DLXXIX. Description is often more to be
employed in Sciences, than Definition
this every part successively and separately
examined must agree.

DLXXX. This method is termed Synthesis
among Mathematicians and it is used by
those who do nothing but what is
different to that it cannot be done with
great difficulty every thing is easily and
speedily attended every thing to it.

DLXXXI. This is a very powerful means
by which many different sciences, arising from the
first principles, are joined that we may
be able to know and discern the things
required, with the assistance of the others, and
to know and discern from the others, that
we may be able to distinguish and
discern by the

DCX. But the respiration may be impeded when the Lungs are perfectly sound and the passage to them completely clear; as when the Thorax itself is filled with water or blood or when air has been admitted into it in consequence of a wound penetrating the cavity of the chest by either of which the Lungs will be prevented from distending properly. This will happen to a certain degree when only one side of the Thorax is wounded on account of the communication between them by the Trachea (when the chest is expanded) but if the wound extend to both sides the breathing is soon entirely suppressed.

DXCI. Respiration may also be rendered imperfect or difficult, from various diseases in which the organs within the breast are liable to be affected; as from debility, paralysis or spasm of these parts, or from pain or rigidity of the diaphragm or intercostal and abdominal muscles. And the same effect is produced when

the

582. In some of the male species we find the tears flow [illegible] with pain but they are seldom accompanied with any noise similar to weeping in man. Thus Jaques Stag in Shakespear "The big tears coursing down his cheeks."

when the moving organs are perfectly denied.
if there be any hinderance to the enlargement
of the chest, as where the ribs become rigid
and immoveable, or where the descent of the
diaphragm is impeded by water in the ab-
domen, or when the stomach is overloaded
with food and drink or when the feces in
the intestines so high as to press it upwards.
or in cases of a preternatural enlargement
of any of the viscera; or lastly when all the
parts below it press upon it, in which
cases the Dyspnoea is most severe when the
patient is in a reclining posture.

DXCII Another cause of difficult respiration
proceeds from the sympathy that exists be-
tween the muscles employed in it and the
other parts of the body chiefly the bowels by
which means these muscles are sometimes
thrown into violent convulsions or otherwise
so deranged that they are incapable of per-
forming their usual functions.

DXCIII.

DXCIII. Lastly in all cases where the motion of the blood through the Lungs is impeded respiration will be difficult and laborious whether the defect of the circulation proceed from any malady in the blood itself or from any derangement in the structure of the organs or if it be occasioned by a debility of the moving powers such as happens before death.

DXCIV When we reflect that Respiration is liable to be interrupted by so many different and well known causes (and that one of them viz. is so apt to induce the rest) the reason will be obvious why it is so common a disease; and why it accompanies so many other disorders: being sometimes a nervous affection in one patient slight and soon disappearing, while in another it is obstinate and irremovable. why in some it is a hereditary complaint at one time dangerous and causing sudden death: and at another at-

tended

tended with no danger. why it is so apt to recur at stated intervals; and why in some it is produced by heat and exercise, while in others moderate exercise will relieve it. we can also readily see why it is increased by fullness & why bleeding often relieves it or at least renders it more mild.

DXCV. When respiration is impeded from whatever cause, it always diminishes the circulation more or less: hence it produces general debility by interrupting various functions and thereby inducing many disorders chiefly of the dropsical kind. (463. 467) If the lungs are so far compressed for any time and not distended as they ought to be, the vapour from their surface becomes diminished and of its usual quality; hence they become overcharged with watery humours, and being at the same time irritated an increased quantity of their mucus is secreted which fills up the air vessels and stimulates them so as to

to produce a violent and distressing cough: which is an effort of the Lungs to liberate themselves.

DXCVI. This vital function is likewise liable to other maladies as that of coughing and sneezing; both of which, although at first they appear to be severe; yet they are by no means useless: but may be deservedly termed wholesome. They were ranked among the wholesome efforts of Nature (59.64.361.5.) however they are not at all times without danger and inconvenience; whether that proceeds from their being too violent or from their being of no avail (64.365.) or from their being excited at an improper time. In whatever way this may happen it is the duty of a Physician to be well acquainted with the nature, causes and effects of these actions; so that he may be able to promote them when salutary to restrain them when too violent, and check them when useless or hurtful.

DXCVII

DXCVII. A cough is produced by a violent sonorous and often involuntary expiration of air through the glottis when it is in a more or less contracted state; and which is expelled suddenly and with great force. The force in this case proceeds from the action of the muscles of respiration and the sound is occasioned by the contraction of the glottis. A cough is often repeated and continued for a long time, by each expiration being followed by an inspiration which is laborious obstructed and imperfect on account of the contracted state of the glottis.

DXCVIII. Coughing is excited by the application of any Chemical or Mechanical stimulus, ordinary to the passages by which the air enters the Lungs. The lining membranes of these passages are of the most delicate structure and so readily affected by any stimulus that they cannot

cannot endure the touch of the mildest body. even drops of water will irritate them and instantly through the muscles of respiration into a violent agitation; while at the same time the glottis is contracted per sympathy (355.) which it like other parts of the body possess in a great degree. Then the air is expelled with so much force as to burst open the aperture of the glottis, although firmly closed and the irritating substance which excited the cough is thrown out with it. In this way the action of coughing is not only useful but absolutely necessary to life; for by it alone we are enabled to clear the Lungs from any irritating substance as phlegm which otherwise would soon fill them up and suffocate the person.

DXCIX. Besides the noxious substances that may enter the Lungs by the same passage as the air, they may be hurt by the

muscles

mucus itself being too copiously secreted or becoming too thick or too thin or acrid: or by blood serum pus or water lodging in them either of which will excite coughing; and it is a concomitant symptom of all inflammations of the Lungs: and all cases of difficult respiration. The Larynx itself or its branches may become preternaturally sensible; by being inflamed or deprived of its usual mucus which protects its nerves from the irritation of the air; so that the air itself may excite pain and violent coughing when inhaled. And we find there have been examples of cough produced by disorders irritating other parts of the body as in depraved states of the whole nervous energy; or from mechanic irritation the intestines or even by pain or inflammation of the liver.

DC. Cough may also be excited voluntarily and subjected to the government of the will; but we can often moderate or suppress it when not

not under the power of the will by a contrary effort; but when the propensity to coughing is very violent it cannot be resisted.

DCI. When a cough is once excited, it continues till the irritating substance is expelled, or at least till the irritating sensation be suppressed and diminished in consequence of the more impressing sensation that the cough produces. Then if the irritation return after sometime so will the cough. Hence we are taught a method of alleviating or ceasing their dangerous malady, although we are not at all times able to remove the cause of it.

DCII. When the breath is long retained by any other act it is frequently attended with the greatest danger; producing hæmorrhagies by the blood congesting in the lungs and distending and rupturing their vessels. These hæmorrhagies in some cases are to such an extent that they produce sudden death; and in others are the origin of a no less fatal though slower issue. These are also attended with a frequent and

Dissection

distressing cough; perhaps without any haemorrhage, but which weakens the Lungs and lays the foundation for an incurable Phthisis Pulmonalis.

DCIII. In short by long continued cough the passage of the blood through the Lungs is partly stopped, and it regurgitates in the veins of the head; hence arises the red or livid colour of the face; the sanguineous spots on the nose that sometimes happens; and sometimes of bloodvessels in the brain producing apoplexy, paralysis, convulsions and death.

DCIV. Lastly from a severe cough the contents of the abdomen are much compressed, and if any part of it be unusually weak, hernias, prolapsus ani, &c. tumours and miscarriages will happen.

DCV. When a cough is mild but very frequent & troublesome it is by no means a symptom of fever although it may not be so eminent as when it is violent: it always agitates and fatigues

injures the functions, keeps him from sleep
recalls his strength, and brings on fever; it also
shakes and irritates the lungs, impedes diges-
tion and other functions of the body so as to
perfectly insufferable by the sick.

DCVI. Sneezing is an action very nearly alied
to cough, being produced by a full inspiration
succeeded by a quicker and very violent expi-
ration; while at the same time the tongue and
palate are forced together and the air expelled
through the nostrils which are cleared by it in
its passage. The contraction of the muscles
here is much more violent than in coughing;
and it cannot be imitated or excited at pleasure
but it is very difficult to ascertain which the pre-
judicity to it is excited. Agitates and disorders
the body much more severely than coughing.

DCVII. A cough is produced by any thing
irritating the glottis fractures the lungs; so sneez-
ing is produced from irritations of the membranes
of the nose; and so from [illegible] &c.

remote cause. In the same manner when the cause of irritation is removed or alleviated by evacuation, the same is the case with the sanguineous. Hence it is often a salutary action for the body not in some instances hurtful; as hence it is frequently repeated or too long continued.

Chap XVIII.

Chap. XVIII.

Of the Degestion of Food

DCVIII. The body from its being subjected to so many actions both vital and animal, is liable to decay from the fluids being dissipated, and the solids worn by friction; and from both being subject to fermescency. (6)

DCIX. But we are warned and excited by our cravings to repair its losses, and correct its putrescent tendency by taking in such substances as are proper for this end: and our choice of these substances is guided by instinct, taste and smell or by experience.

DCX. When the stomach becomes empty and the body a little exhausted from want or the usual exertions of life we feel an unpleasant sensation referable to the stomach, with a desire to eat something. This

at first is very slight, but unless relieved by taking food, it increases by degrees till at last it becomes very severe and perfectly irresistable.

DCXI. Besides when the fluid parts are dissipated by insensible acid by any food being taken into the body; the fauces become parched and there is a great desire for drink excited. This last is what is termed Thirst and the former is called hunger.

DCXII. A man cannot always feel hungary from the stomach being empty and from no other cause: a deficiency of the whole body or any increase of the secretion through the skin contributes in a great degree to produce this sensation. (354.) We also find that any contraction of the muscular fibre of the stomach will occasion hunger; for there are many stimulants which if taken into the stomach even when it is considerably distended

tenderer, will excite a sense of appetite in a man although he cannot use said Effect hunger. This is the sensation that glutterous excite although not without Danger to themselves.

DCXIII. When the place taken in is of a little or too thin quality, it neither nourishes nor refreshes the body as it ought to do, hence nature shows us that man requires food of a thick and dry nature, although it may not be so very nutritious or agreeable to the taste.

DCXIV. All kinds of food are derived from the vegetable and animal kingdoms. And man as nature seeks for both as he finds that what either he is most accustomed to procure of both kingdoms, is best calculated to nourish him and agrees best with him. Although there are some people who pretend they do not use flesh, nature, never taste animal food but live entirely upon fruits.

DCXV. Some pot herbs and a few of the fruits which have

hence but little nourishing matter in them as
used as spiceries. These seasoning substances
possess something agreeable to the taste and
a grateful scent, although they are in some
cases rancid fetid and unpleasant until they
become agreeable from custom which is the
case with them to all animals but particu-
larly to man. These seasonings however do
not want their use. For they stimulate the tongue
and render the taste more complete; so there-
fore is rendered pleasant even when it has
but little taste of itself. They likewise excite
the action of the stomach and accelerate di-
gestion particularly where it is weak; for
we find that this function is not well per-
formed when the usual spiceries are laid aside.
DCXVI There is little question a change re-
quired for preparing animal food for man, be-
cause it differs but little in its nature from
the human body except the disposition of its
solid

solid parts. But the oily parts both of animals and vegetables which are the most nutritive parts of them; differ considerably in their nature from the humours and flesh of the human body. And the glutinous parts of fruits and the farinaceous and saccharine matter which they contain is likewise very distantly removed from the nature of flesh; and the same may be said of the roots and other parts with which animals; either by eating the herbs themselves or by feeding upon other animals who live upon these substances

DCXVII. The food is taken into the mouth by the lips which with the assistance of the cheeks and tongue, turn it over between the teeth, where it is separated from extraneous, provided not properly masticated; while at the same time it is moistened by the saliva mucus and other humours of the mouth the use of which is increased by the stimulus of the taste

the taste of the food and motion of the parts
proceeds. Having thus included the digested
chyle, proper to the pharynx after which it is
no longer under the control of our will, for
any forcible effort of ours is unnecessary. By
the action of the parts it is thrust into
the gullet; which it dilates and stimulates to
contract; which contraction by commencing
at the pharynx and passing towards the
stomach impresses the food down before it, where
it remains for the proper length of time. Hence
then it is obvious that the food does not de-
scend into the stomach so much by its own
gravity as by the contractile power of the
gullet; for there are animals whose food pro-
ceeds ordinary to its own gravity in swallowing
and this can be done by man himself.

DCXVIII. The food does not immediately pass out
of the stomach but is retained there for some

Time

tunic: hence we find the pylorus a little more contracted, and a little elevated by means of the short fibres that surround it and the ligaments which descend from the upper part of the stomach. But after the proper time the pylorus relaxes and the food passes into the duodenum or higher part of the intestines almost like a state of solution; where it is subjected to the action of the intestines and pushed forwards by their motion.

DCXIX. The nourishing mass being thus prepared either from flesh or fruits or from both combined together, is first softened solicited and properly reduced into a pulp by mixture with the saliva; it is then succeeded by the heat generated in the body; and being agitated inhales a great quantity of air; first undergoing the acetous and then the putrescent fermentations.

DCXX. That the food undergoes these different changes

changes is perfectly evident from the unelastic gums & acid stains of the stones that frequently happen; and from the vomiting of acid and putrid matter which is so common to those who digest badly

DCXXI. Because from these experiments that the coagulum in the stomach of a healthy man always undergoes a certain degree of fermentation; and that the whole mass becomes acid in a few hours after it is taken in.

DCXXII. But we must reflect that it is only the slightest degree of these changes that can happen to be of any service in people of health; for it is well known that the more violent the fermentation is, the slower and worse is digestion performed.

DCXXIII Hence it is manifest that there is some power in the intestines that counteracts this inconvenience and prevents the almost too fermenting bad violently. When

power

which power is thought to reside in the proper juice of the stomach which is secreted very copiously. But if the food be retained too long in the stomach (which often happens if digestion goes improperly on) this juice is sufficient to counteract the tendency to putrefaction which the food proposes in a great degree.

DCXXIV. This juice is also of service in dissolving the food so that it does not suffer the intestines to be in a state of putrefaction. But this solvent quality is not the same in all animals; for we find some who can dissolve flesh and other vegetables; but the juice of them in any other sort of food. Man, hawks and other animals that live upon flesh or fruits promiscuously readily dissolve both kinds. This business is chiefly performed by a permanent made both within and without the body. And it is found

found from these experiments that there are some fruits so hard and others so soft, that they cannot be digested even by a healthy man till it be divided by the teeth or broken and bruised in some other way.

DCXXV. The food when it is dissolved and has acquired a slight degree of acidity by remaining in the stomach, does not appear to retain any of its acid qualities after descending into the intestines; at least in a healthy person. But seems to be owing to the power of the mucus of the intestines which resembles that of the stomach very nearly; or to the pancreatic juice which is now secreted very copious and is almost of the same nature as the saliva; but above all the fermenting process is most checked by the bitter fluid secreted from the liver; which has not only the property of preventing its becoming more acid but also corrects the acidity already generated.

this fluid, tends the gall, also appears to promote the solution of the food by combining the oily and watery parts together; and it is likewise serviceable for promoting the contraction of the intestines.

DCXXVI. By mastication and the saliva mixed with the humours of the mouth, stomach, and intestines; and lastly by the help of the gall and pancreatic juice the food is reduced to a state of fluidity; which process is probably accelerated by its own tendency to fermentation which produces its adhesion together. But the nutritious principle is not absorbed till it enters the intestines when it is taken up by the lacteals during its passage through the guts; and these lacteals creeping through the mesentery pour out their contents into the thoracic duct where the nourishment is mixed with the blood and conveyed to the lungs when it undergoes the final change and

and a part of the true animal matter. But as the food still continues mixed with a great deal of the humour that has been secreted into it by the intestines, liver and pancreas it does not become inspissated till it reaches the large intestines; after which it is more sparingly diluted, and losing its superfluous moisture it puts on the true stercaceous appearance; and often becomes so firm that it retains the marks of the cellular intestines of the colon.

DCXXVII. Hence by an means acquainted however with all the changes the food undergoes in the stomach and intestines. For as the nature and qualities of fermentation and the different kinds of it are but little understood, we are not able to explain the reason of digestion properly. For we do not say the whole manner that the solution of the aliment is performed for it is not only dissolved but its nature and qualities are completely changed so that it enters the blood in the form of chyle, then milk.

milk itself which of all others most nearly resembles chyle, must be first coagulated in the stomach and then dissolved and changed into chyle like other food before it can be proper nourishment for the body.

DCXXVIII. The motion of the Intestines in a healthy person is very simple and is what is termed Peristaltic. It is performed by one portion of them contracting after another partly from the nervous energy; and partly from the stimulus of the aliment which being pressed downwards by the return of their nerves stimulates it to contract likewise thereby producing a desire to go to stool. This stimulus is then communicated to the abdominal muscles and diaphragm which being thrown into a state of powerful contraction overcome the sphincter of the anus; and the superfluous part passes out of the body.

DCXXIX. Physiologists and medical men have had to assign many other reasons for digestion some of them attributing it to heat, and others to agitation and the putrefaction the aliment undergoes

624. The solvent power of this fluid (gastric juice.) is sometimes very powerful especially birds. for it is well acertained that the Ostrich & some others will digest metals. And we should suppose from reason that such animals as dont masticate their food will have the gastric juice most powerful as a solvent.

undergoes, so like others have thought it was the effect of fermentation alone: but neither of them have been able to establish their opinion by satisfactory arguments. But these have demonstrated their labours are vain, & neither subject. For they have shown how this ferment and function may be initiated in various ways and thereby pointed out the remedies proper for restoring it

DCXXX. Some kinds of food are easily digested and others with great difficulty. But in this particular there is an astonishing difference in different men; and in habit, for the food, that will agree with one person would almost be poison for another. And the strong stomachs of labouring men will digest the hard food which they are accustomed to more easily than food of the most delicate kind.

DCXXXI. Almost every species of food that we use is softened and rendered mild by heat; and

and it is also made more apt to dissolve and more easily digested by being fermented and combined with various sorts of seasonings. It is upon this principle that the art of cookery depends; which is not only agreeable, but has now become absolutely necessary for Europeans; however when this art is pushed too far it is hurtful: both by mixing and compounding things together which are of opposite natures, and by introducing more than is proper. Most meats are sufficiently digested by the acidity and mixture of different sorts of food (although this is by no means natural its design seems to be making the aliment digested rapidly), as upon their taking too great a quantity of it. For a man in health if he is not too hungry will rather take too much of any simple sort of food;

but

but if he be tempted with variety and these
it elegantly carried and seasoned; he will
eat three times as much as he ought.

DCXXXII. All kinds of hard fruits or kernels, if they be raw, called or
unripe or sour or with pepper and ar-
matics and all those of a glutinous or
oily nature are thought to be the most
difficult to digest. It is also said that the
flesh of young animals and of liver is more
indigestible than that of full grown ani-
mals.

DCXXXIII. That the solvent power of the juice
in the empty stomach of some animals is
so great that it will not only dissolve and
digest oil, gluten and cartilages, but even
one itself, and the hardest ivory, and it is
said to eat its way into the stomach itself
for a short time after death.

DCXXXIV. From all that is obvious why the
action

digestion is so often vitiated; and why acid and putrid corruptions of the first use do commonly in people whose digestive organs are weak. Likewise why it is so readily disturbed and affected not only by diseases of the body, but also by several mental affections. From this we may see the reason why bodily exercise promotes digestion, and why a glass of wine or good Beer sometimes helps digestion.

Chap XX.

Of the effects of digestion and the various morbid affections to which its organs are liable.

DCXXXV. The appetite for food frequently fails and becomes depraved, owing in a measure to the state of the stomach and in a great degree to the state of the body. Hence we find ourselves unable to understand and relish many dishes at a time when it is not in our power to decide upon their condition as regards agreeableness. Glutton are frequently troubled with a morbid appetite; but in them it proceeds from the body having a better judge for itself than the mind; and hence it rejects the food that does not agree with it as well as it does assimilate.

DCXXXVI. The appetite will become impaired or perhaps totally vanished, if the stomach be not supplied with food; but if it be, hence there will be no desire for food after a time. All that has been eaten be digested, or the appetite will be annihilated; for in the digestion it is in many ways [illegible]; for inside

[illegible]

ailment does not readily give room the stomach
into the intestines. Hence accrues to these the usual
service to employ the bowels. 112. The appetite
will be impaired as the stomach is oppressed
with meat and digestion is hereby rendered
difficult and laborious and therefore the
stomach is weakened which in time causes
pain very suddenly; and hence a great pain
in the forehead in the left eye and
face cannot be a sure indication of the vomiting
sickness but rather a relief of the appetite. But
we must not suppose the worst [illegible] nothing which happens
to patients in a fever should be reason to
hurt her if the sick are not [illegible] by it nevertheless
health. On the contrary the symptoms
bowels should be carefully
observed. For it is the business of nature to
raise what it cannot digest to keep it without
being hurt.

DCXXXVII. Even in health the appetite
is subject to great variation, being in some
cases

excess of secretions that it arises from consider-
ed as a disease. This however sometimes
happens in that case from long
lasting & great depletion. Such an increase
of the natural secretions is accompanied with many
pieces from a preternatural quantity of serum
may either generated in or received into the bowels
in which they are too much stimulated by their
acrimony & irritation, so from hurt. Sometimes
not the cause that a man dies from a certain
time in spite of every custom alone.

DCXXXVIII. A diarrhoea of the appetite accom-
panied with a desire for some unusual sort of
food, as perhaps for something not generally
eaten proceeds from a disordered digestion
has much disagreed especially if the patient
finds so much of the taste of the same food
it has been disposed for any length of time.
This seems to be the reason why this sort of
has is so common to women when pregnant
in whom nature to throw it that state because
the womb not allowing they used to be supplied
elsewhere

perfectly well, and in the necessary at that time; and the more they indulge themselves in these notions, the more violent they will be to their unlawful attempts. When a woman, who is with child, gives way to indulge this propensity, they conceal such inordinate desires, and when it is frequent and very violent and not indulged, many substances commonly used as food they will also conceal it for the sake of secrecy. But if the husband indulge his wife when pregnant and she is compelled to eat for secrecy, that husband is answerable for it, if any accident should happen to his wife during any future pregnancy or during child birth, he would be considered as a murderer.

DCXXIX. Sometimes an inordinate desire for certain substances, or an aversion, proceeds from a peculiar state of the body, which is called as a desire for what is called in the vulgar when there is too much acid in the body, or for acids and herbs in scurvy, scurvy and the

urine

wine or the like in fevers. Appetites of this sort when moderately indulged may be good: but are rarely heard of.

DCXL. Thirst like hunger is observed to be a feature in some cases and in others to be the reverse. A defect of it can hardly be said to be a disease while there is no other morbid appearance, and digestion is properly performed, because this can only happen when the body does not require drink. There are also some people who never feel thirsty; from their being in a moist habit of body; and accustomed diet and food; by which means the humours of the mouth are so copiously secreted that the fauces are seldom dry or parched.

DCXLI. The patient sometimes does not feel thirst when the fauces are quite dry and the tongue so parched that there is an obvious necessity for drink. This is always a morbid appearance and a very unfavourable omen, attending the per-nicious and putrid fevers, after the

the brain during which the patient is insensible of the stimuli that usually communicate, although it be sufficiently strong.

DCXLII. A preternatural increase of the heat is a much more frequent malady; and may arise from a deficient evaporation in the body, either by the necessary fluid being withheld, or by an increase of the specific of the body, or from an obstruction of discharge of urine or faeces which always poisons the body. Or it may proceed from too much nourishment being admitted into the system, from a diminished irritability of the vessels, from too much heat, from a too great quantity of light received, from dry food. The heat may also be unnaturally increased by the vessels being dilated or opened by too much attenuation or by too much relaxation of the fibres: and this disease will be produced by the usual secretions of the mouth being stopped as in the case in certain affections of the

mind

mucus, glands or sphincter: in which the chyle remains detained, from that part, although there may be plenty of it in the body, or in the case in all inspired affections. This obtains when one or all these causes of thirst are combined as we sometimes see them; it will make the symptom more urgent. This is accompanied in fevers accompanied with violent thirst when the humours of the body are dissipated by heat; and the mucus in the mouth diminished: which symptoms are also accompanied with a dissected state of the humours, so that digestion is hindered and the stomach encumbered with crude aliment.

DCXLIII. From all this the reason is obviously discovered that it is so common a disease and why it is in some cases a salutary affection and in others perfectly useless: we also may see why at one time the sick person requires a great quantity of drink, which the stomach absorbs as soon as it is swallowed; and which leaves

the

the necessity there was for it; and why at another time a small quantity will satisfy him and be of more service than a great one, during the stomach being unable to absorb a large quantity: from this too it is evident why acid and astringent fruits, or a little wine mixed with the drink, will satisfy the thirst in some cases better than pure water; and lastly why in some instances no drink will satisfy the thirst but it will be alleviated by such medicines as produce vomiting.

DCXLIV. Sometimes the action of mastication is hindered from the various organs employed in it being disordered, as pain, pain, swelling, inflammation or ulceration; or from debility, rigidity or spasm, or from defect of the teeth, jaws, cheeks, lips or tongue.

DCXLV. The action of swallowing may also be hindered from similar disorders affecting the mouth, throat or gullet; or in quinsey, hydrophobia or paralysis: and in cases of great debility such as happens in the end of some diseases

of

of the febrile kind when it is accompanied with symptoms and commonly precedes the fatal issue.

DCXLVI. The digestion of the aliment is very often intermitted after it has passed into the stomach; but this is an affection attended with more inconvenience than actual danger.

DCXLVII. Digestion may be impeded in the first place in the last place; as when it is taken in too great quantities or of an improper quality or mixture; or at an improper period and not properly masticated in the mouth; by which means the stomach will become overloaded and too much distended so that it will neither be able to dissolve the food nor propels it properly. Or the alimentary magma may become indissoluble and too prone to corruption, so that it ferments and putrifies too rapidly; or the power of the stomach which ought to restrain its too easy fermentation according to [illegible] 623.

DCXLVIII. But the least and most easily digested

bad

food may become indigestable, by the stomach or any of its organs being disordered; and a similar effect will arise from disorders of the whole system.

DCXLIX. A defect in digestion will be induced by any disorder in the humours with which the aliment is mixed: or by a debility in the muscular fibres of the stomach producing an obstruction in the pylorus and thereby preventing the food from descending into the intestines. The same effect will arise from a too slow motion in the intestines the muscular or from any of the various disorders to which these are liable: as from general debility whether that be occasioned by disorders of the body or affections of the mind; and from neglecting to take the usual exercise; and from a diminution or suppression of cutaneous exhalations; whether that proceed from leaving off cold particularly when applied to the feet: or from a too cold and moist state of the atmosphere

DCL

DCL. There are a great many Disorders arising from a depraved digestion; many of which are very serious and not easily cured, although few of them are immediately dangerous to life. Among these we may mention oppression and dizziness, pain of the stomach and eructations from an agitated churning fermentation; irritation of the stomach rising up to the throat; likewise nausea and vomiting from the stomach being distended and irritated; costiveness or diarrhoea, a deficiency of nourishment diminishing general activity and vigor of the solids and a great debility of the fluids. All the functions are in a precarious state which is accompanied by pain of the head & vertigo, fainting, asthma, palpitations, and a great breathlessness especially if the patient has a peculiar habit of body. Sometimes indigestion occasions gout, dropsy, and slow lingering fevers which will at last terminate in death

DCLI.

DCLI. The motion of the intestines is sometimes carried too far and the matters too quickly from which arises costiveness at one time and diarrhœa at another.

DCLII. Costiveness is a common occurrence in the progress of a robust nutritive body; but when it is much carried or long continued it must be considered as a morbid symptom, and is by no means without its danger. We also find it accompanying that symptom in an effect and sometimes the cause of many other diseases. It proceeds from a diseased state of the intestines; as when they are contracted, closed or any ways obstructed, either from spasm or schirrous, or from one part of them slipping within another, so as to produce an inflammation; or this affection may be occasioned by the fæces being too dry or hard so that they are propelled with difficulty; from the fæces being of too dry a quality or the drink too sparing; or when the humours that moisten the intestinal tract and lubricate the intestines become deficient 626.

Hence

these humours may be sparingly secreted or perverted. Hence of their secreting against the cause of which is often but little understood: as we find to be the case in the first stages of all fevers, when the blood having a determination to the surface of the body: as is induced by frequent and violent exercise; heat and copious perspiration. A preternatural incrustation of the faeces is also apt to happen from a debility of the peristaltic motion of the intestines; in which their wonted stimulus is not made, as is the case in suppressions of the gall in the kings evil; or when the food is too sparingly used or is not possessed of that degree of acrimony which is requisite to excite the motion of the intestines.

DCLIII. But the alvine discharge whether putrid or acid appears to be greatly regulated by custom; and even all other secretions become habituated for a time with least danger to the system. In general the food passes through the

the body in the space of one day: but it is often much quicker, and many are so much shorter, for there are people who empty the bowels twice or three times a month. This manifold depends upon the age and constitution of the patient, and upon the degree of acrimony there is in the load he uses.

DCLIV. When the alvine discharge is too long suppressed the tubes of the intestines are first affected, and then the whole body. The stomach first becomes disordered and digestion impeded; then the whole body is unusually excited and heated as is particularly visible in fevers: the blood itself also becomes vitiated in absorbing the putrid matter in the course of its circulation. The passage of the blood in the abdomen is likewise interrupted, thereby inducing congestions and a decrease state of the veins; and effusions of blood into the intestines, which flowing from the intestines constitutes what is called the hæmorrhoids or piles.

but in these cases the intestines themselves can
not be accused from their being overloaded, distended and irritated by their acrid and putrid
contents; which excites them to very powerful
and unusual efforts; and if the obstruction
cannot overcome by these, it occasions severe
pain, colic and iliac passion, which terminate in inflammation, gangrene and death.

DCLV. If the faeces be too frequently discharged and of too thin a nature the disorder is termed a flux or diarrhoea, which is a very complicated and frequent malady; being in some cases a primary disorder of itself, and in others the effect of other diseases: it is also in some instances a salutary effort of nature and ought to be imitated and excited as far as possible by art. In some men a diarrhoea is a natural affection and particularly so in children who suffer very severely from dentition.

DCLVI. This disemper proceeds from many different

different causes; chiefly from some matter either
received into the body or generated in the intes-
tines, from the putrescency or acrimony of the
alimentary mass: or from an unnatural
quantity or bile particularly if it proceeds
from great effusion of blood into the in-
testines or vessels of them. The same effects
also be produced when the intestines receive
their accustomed stimulus from the humours
being repelled from the surface of the body and
poured copiously into the cells of
them: there is a general tendency to putrefaction
in the whole animal economy from whatever
morbid cause producing it, chiefly
towards the termination of these diseases. In
these cases a diarrhœa is considered as a
salutary symptom; as it sometimes brings
the disease to a crisis, but it must
be carefully distinguished from a
colliquative diarrhœa, which hastens
the strength of the patient
particularly when it proceeds from putres-
cency, hence the necessity for a timely expul-
sion

application of the proper remedies to liberate the bowels from the fluids and matter with which they are loaded. The most immediate fluxes which generally terminate in death, sometimes occur after the operation of a fistula in ano. Those who are also of a nervous habit whose tempers are weak and irritable (360) that are much exposed to cold, or any unusual affection of the mind will produce this disease. But we ought to remember that from whatever cause it proceeds, if it be attended to continue long it weakens and irritates the intestines so that although it may be cured it is apt to recur from the slightest exciting cause; in which circumstance it resembles many other diseases (383).

DCLVII. From all this the plan necessary to be followed is very obvious both to curing and alleviating this disease: viz by using emollient glutinous or gummy medicines; and sometimes such remedies are necessary for correcting acidity and putrescency; or opiates, or

lenients

astringents or a change of climate or keeps to cause the putrefaction artificially.

DCLVIII. A Diarrhœa is principally induced when its expelling the body of its proper nourishment; for the digestion is not only vitiated in the motion of the bowels being disordered but the alimentary mass passes so rapidly through the body; that it is neither properly assimilated nor have the lacteals time to absorb the proper quantity of nutritive matter so as to convey it into the blood.

DCLIX. It is also hurtful from the great depletion it produces in exhausting the whole body by abstracting a portion of the nutritive matter from the blood. so that not only the whole of the aliment but also a great quantity of the intestinal humors is discharged out of the body. And by this means the whole system is soon affected with the debility of the intestines.

DCLX. In some cases a moderate Diarrhœa

when

inflammation continues & rises to such a height that the fever passes through the body very little changed, which immediately is termed a Dysentery. The same thing happens in some cases although not seldom from obstruction in the glands of the mesentery so that the Chyle is voided with the faeces which thereby constituting what is called a Colic flux.

DCLXI. There is another disease attended by the name of Dysentery in which there is violent grinding pain in the bowels accompanied with a frequent desire to go to stool but where little nothing passes except a little mucus & blood. This malady is often attended with great debility, fever, tenesmus and fever. It is supposed to proceed from some part of the intestines being constricted most generally the colon so that although it is muscle imitate nothing passes. This disease commonly is removed by the use of proper purgatives.

DCLXII. A frequent and inexplicable desire to go to stool accompanied with severe straining pain while nothing is passed from what is called a Tenesmus. This may be induced by any sort of

of irritation affixed to the rectum or neighbouring parts; hence it is sometimes brought on by the use of acrid medicines, as aloes, which possess the peculiar property of being slowly diffused and sometimes pass to the rectum very little changed. A severe and long continued dysentery, hæmorrhoids, worms, or distended or calculous bladder or urethra will also produce tenesmus. This is a disease attended with very great danger, besides its distressing and disheartening the patient; the straining is apt to induce a prolapsus ani; and pain very injurious by irritating the bladder and parts contiguous to it.

DCLXIII. We sometimes meet with a complete inversion of the intestines so that their contents pass out at the mouth. A slight degree of this takes place in cases where air is extravasated during imperfect digestion; when it rolls about in the abdomen through the coats of the intestines and then rising to the stomach passes out at the mouth; forming what is termed eructations.

DCLXIV.

DCLXIV. But a far more serious species of this disease happens when not only air but also crude and half digested aliment or whatever is contained in the stomach and intestines is vomited up. There are some people to whom this is a very common disorder; and there are others who can excite this action at pleasure with very little exertion; resembling in this case ruminating animals.

DCLXV. It is in this way that infants are enabled to discharge the contents of their stomach when they have sucked too much and which they are enabled to do without any great exertion and without being sick.

DCLXVI. Any diseased state of the bowels often produces that highly unpleasant sensation which is termed nausea. This is frequently accompanied with vertigo (264. 268.) When nausea comes on there is not only an inversion of the motion of the stomach; but it also extends to the

that part of the intestines which is next it. The Diaphragm and abdominal muscles acting then thereby indirectly by their sympathy with the stomach compress the contents of it till they are thrown out by the mouth with considerable violence. Vomiting is usually preceded by an increased flow of the humours of the mouth and a trembling of the under lip: and it is accompanied with a full deep inspiration which prevents anything getting into the windpipe.

DCLXVII. Nausea and vomiting are very frequent disorders: and may proceed from many different causes; not only such as immediately affect the stomach; but even those that affect the more remote parts; from which their irritations and affections are communicated to the stomach by sympathy.

DCLXVIII. This affection is brought on by anything that irritates or distends the stomach: as when it is overloaded with crude indigested food; when its lower orifice obstructed; or when any acrimony is received into it; as in disor-

-ders

diseases of the liver intestines, kidneys uterus, of the head feet, skin or whole body
shutting and emitting a false light caused
by inflammation, caloric the kings evil
scirrus or cancer, or by compression or
fracture of the skull, vertigo fainting, or by
strong spirits or the acrid gout, by fe
vour or affection of the mind arising from the
contemplation of disagreeable objects
that is detested.

DCLXIX. From all this it may be seen
why this disease is so frequent, and why in
some cases it is a primary affection and for
others the effect of some other disemper, why
at one time it is a salutary effort of nature
and ought to be promoted by the mildest
means as far as possible, and attention to all
other circumstances should be observed.
Further we have an example in fevers when
it is a salutary beneficial and will break
the

the force of the disease; but when frequently
returns a fit or at least succeeds from
the fever; and if continued is apt to prolong
the distemper, and exhaust the patient.

DCLXX. Nausea and vomiting are often of
service not only to the stomach and bowels
by liberating them from any offensive sub-
stances that they may contain; but these ef-
fects also do good to other parts, and even
to the whole body. Thus they are favourable
promoting expectoration; as when the lungs
are overloaded with mucus, blood, serum or
water. They also favour perspiration by ex-
creasing the flow of blood towards the skin,
partly by the straining that accompanies
them; and partly by the consent that exists
between the stomach and surface of the body.
Hence vomiting is an excellent remedy in
many disorders.

DCLXXI. Sometimes these effects do not
particularly

particularly when violent or too frequently repeated. The injuries which most frequently proceed from them are first a great debility in which the irritability or muscular action of the stomach occasioned by the violent straining: secondly they fatigue the person and may induce hernia, ulcerations or haemorrhages from the stomach, lungs or head from the violent respirations attending them; although this last is a very rare occurrance. If not inforced violent or too long continued; like Diarrhoea it will debilitate the whole body; by diminishing and corrupting the humours of the stomach, &c and induce indigestion and all the ills which accompany it.

DCLXVII Sometimes meet with a complete inversion of the motion of the intestines extending all the way from the mouth to the anus forming what is called an Iliac passion; which is a very dangerous disorder. This frequently proceeds from some obstacle impeding the descent

of

of the alimentary mass; and a spasm, obstruction or inflammation; or pain a long continued thus inducing a colic of which an iliac passion is an effect and forms a part. We also sometimes find a very perfect iliac when there is no obstruction in the intestines; so that a clyster will pass out at the mouth; and patients have been known to recover after being several days in this state.

DCLXXIII. An iliac passion commences with a severe pain in the bowels accompanied at first with nausea and belchings; this is followed by a copious discharge of bilious matter by the mouth with frequent and violent vomitings and severe pain in the bowels; while at the same time the alvine discharge is completely suppressed; and nothing can be retained in the stomach. The patients strength sinks very rapidly; and he is sensible of his own danger for the disorder soon passes into inflammation which terminates in gangrene.

DCLXXIV. A slighter species of this disorder sometimes occurs, in which the motion of only the superficial of the intestines is ill tuned. This is produced by long continued vomiting as in cases of sea-sickness or even the medicines injudiciously administered and sometimes from an increased quantity of bile effused into the stomach which is discharged by the mouth.

DCLXXV. A severe diarrhœa accompanied with vomiting from what is called a cholera. It arises from some substance irritating the intestines, but without any obstruction, generally from too great a quantity of gas of a putrescent nature hence the name of the disease. It may also be brought on by the admission of other but less acrid substances as from an overdose of some medicines or from eating too much ripe fruit. This is a very violent disease inducing great debility and will soon terminate in death if the proper remedies be not applied.

Chap. XX.

Chap: XX.

Of Secretion and Excretion. - Their varieties and effects.

DCLXXVI. During the distribution of the blood to various parts of the body by the arteries, there are a number of humours secreted from it; which differ from the blood itself and from each other in their natures. Some of these are used for various purposes in the body; and others are carefully expelled from it as being noxious or superfluous. Some of them consist in the procreation of the species, and others serve as food for the young animal as soon as it is born.

DCLXXVII. To the first class of these humours belongs the saliva and other humours of the mouth, the juices of the stomach and intestines, the pancreatic fluid and the bile, also that moisture which lubricates all the cavities of body both large and small, the

fat

70. The intimate sympathy which exists between the surface of the body & stomach; - though well known from experience has never been satisfactorily accounted for or properly explained. - It is however well attested and exemplified in the fact that perspiration may be excited by substances taken into the stomach: and vice versa one can often suppress vomiting by applications to the surface of the body.

the last, and the sebaceous liquor of the skin; the mucus of the different passages through which the air, food & urine pass. the tears aqueous humours of the eye and the wax of the ears.

DCLXXVIII. To the second class belong the circulations of the fluids although these are secreted from the pulmonary artery and not from the aorta; the fluid that passes off by insensible perspiration, the sweat and urine.

DCLXXIX. Lastly among the third sort are found the seminal fluid of the male; the milky liquor of the prostate glands; and that which is found in the female ovary; likewise the liquor amnii and whatever other fluids of the female are necessary to generation. And last of all the milk which is secreted soon after birth.

DCLXXX. Authors have divided these humours into different classes, arranged according

according to their qualities.

DCLXXXI. Those called Watery humours are the exhalations from the lungs and skin, the saliva pancreatic juice, the serum and the aqueous humours of the eyes. The mucous ones comprehend all those viscid and gummy humours which amuse and defend the passages of the air, food and urine from the acrimony of these substances. Among these we may also mention the male semen and the lacteal fluid of the prostate glands.

The Glutinous humours are those that lubricate the inner cavities of the body; the vigour animi and perhaps that contained in the ovary of the female. The Oily fluids not only comprehend the fat marrow and sebaceous fluid of the skin, the gall and urea of the urine but also all those which contain so much coagulous matter that they readily coagulate when dissipated.

DCLXXXII. But these humours are often mixed

mixed together; and are seldom to be met with in a state of purity. Thus the mouth is moistened with the saliva and mucus; the nose with the mucus and tears; the pericardium contains the water; and accumulations of the air; and the fluids of the stomach, intestines and joints, as well as those of all the cavities of the body are composed of oil, mucus, gluten and water. And we find by the most accurate experiments that the milk when newly secreted contains a great portion of the above fluids. Lastly, all the oily humours from their first formation have a great quantity of water combined with them.

DCLXXXIII. Besides we find there are animals possessed of many more humours resembling those of the human body; as the white in the eggs of all oviparous animals. And there are others who have humours quite different from ours; as the acid humours of insects, the poison of bees and

and of serpents, and

DCLXXXIV. Here are some of the secreted humours found in a perfect state in the blood, so that they can be obtained pure by simply separating them; of this kind are the exhalations from the surface of the lungs and skin the saliva and pancreatic juice, the tears and watery humours of the eyes, the urine and that fluid with which all the cavities of the body are incased; in short all these compose of water and a portion of gluten or any particular salt which is to be found in the blood

DCLXXXV. But there are other humours of a quite different nature from these; and not to be met with in the blood or in any of its elementary parts in a state of purity (489.494.) These are the fat and medullary substance the sebaceous liquor and the gall. The mucus of the eyes the mucus and seminal fluid in which we find a number of animalculi

floating

floating about.

DCLXXXVI. Lastly there are other humours formed partly of the elementary substances first found in the blood, and partly of others not usually discerned in it. Of this kind is the milk, the glutinous portion of which that forms the cheese by admixture with some coagulating substance, is very nearly allied to serum of the blood when it is diluted with water; (495) but we cannot find any of the oily or saccharine part of the milk which forms the butter and whey in the blood.

DCLXXXVII. Every humour whether secreted naturally or as the consequence of disease may be more or less reabsorbed into the blood; and as it perhaps cannot be again transmitted into its proper organs, it must corrupt the blood to a certain degree.

DCLXXXVIII. In this way there are animals whose whole bodies have the qualities of the ex-

-mined

seminal fluid; and we find that the bile abounds in those persons as in the king's evil is readily known by the blood and tinges the whole skin &c. yellow colored their papers &c. by the urine; and in the same manner when the urine is stopped it is mixed with the blood and diffused through the whole body even to the brain itself.

DCLXXXIX. But we never meet with an instance of any human which is secreted; being formed in any other part of the body; but it is own particular organ: for when we find a human of one part in another where it should not be; it must be owing to its being absorbed by the blood and carried with it to that part.

DCXC. We have not as yet any correct account of the action of secretion; nor any accurate description of the secreting organs; nor is there any great appearance of truth in the various conjectures which the mathematical and chemical

chemical Physicians have advanced regarding the nature of action in these organs.

DCXCI. The secerning organs appear to be formed of blood vessels both arteries and veins by their detaining and twice carrying; or by ducts passing from these for the purpose of conveying the secreted humour to its proper place. An organ of this kind when found in a certain shape with the cellular substance and covered with a tough membrane of that kind of tissue is what we call a gland. Of which kind is the liver, the kidneys, the testicles, the prostate glands and the breasts: likewise the salivary glands and other organs which secrete the juices of the mouth; the crypts or follicles which contain the mucus or ointment. Among the glands too we reckon the spleen, and the brain itself from its resembling other secreting organs in structure. But we are not certain if the conglobate glands of the mesenteric (136, 439) ought to be classed among the secreting

secreting organs or not

DCXCII. In general the quantity of blood sent to the glands is very great in proportion to the size of the organs themselves. The arteries of the secreting vessels and the conveying veins (which may also be considered as arteries) are both much stronger than those in other parts of the body. But the veins that correspond to these and carry the blood back to the heart after the humour has been secreted from it, are observed to be very large, thin, lax and weak.

DCXCIII. This structure which is common in all glands is thought to be given for this purpose viz. that as great a quantity of blood as possible may be subjected to their action; so that the humour secreted may be the more copious. For the arteries by being prolonged in an unusual size, will be the better able to expose the thin parts from the mass of the blood to it. The humour so secreted be thick or thin: and besides the

greater

greater the power of the arteries and the less the resistance of the veins; the more easily will the secretion be performed, and the freer the passage for the rest of the blood to the heart. But we must confess that all these ideas are but hypothetical and deserve little confidence.

DCXCIV. In some of the secretory organs the motion of the blood is very slow; as in the liver and testicles; in the first of which the secretion is made from the veins, and in the last we find long slender arteries running together and sending off many branches; which after dilating and twisting together convey a liquid humour into the Testicles. We also see that a certain structure is made from some particular purpose as we find it the same in almost all animals.

DCXCV. There are some of the most copious secretions performed without the help of glands or at least the glands of them have not yet been discovered. Of this kind are the exhala-

-tions

exhalations from the lungs and skin; the sweat fat and oil those humours which moisten the inner cavities of the body. These fluids appear therefore to be transmitted through very minute arteries; which pass off from the blood vessels and open into these cavities; and upon the surface of the lungs and skin; by pores yet not discovered. The fat is seldom ever met with in a state of purity in the blood nor do we ever find it combined with the albuminous or watery humours; nor in the sweat but a great portion of the saline substances are found in the blood in a state of perfect solution; although they are seldom to be met with in other parts of the body when it is in a sound state.

DCXCVI. We are equally unable to explain what changes the blood undergoes in the glands to be converted into these different fluids or in what way these are secreted or produced in a state of purity.

DCXCVII The Iatromathematicians have supposed

supposed that the blood when conveyed into these organs was possessed of various properties; and that there was a great variety in the size figure and density of its particles; they also further concluded that the differences in these organs; as to their densities attractions and shapes of their apertures corresponded with the varieties in the blood. They also thought that these organs were what communicated the colour to the blood in the same way as we used certain substances (or purifying fluids) by their being mixed with some colouring matter which certain particles of the blood had the power of attracting while the rest were either allowed to pass through unchanged in some other organ; or were detained for some other purpose. But all these conjectures are founded in uncertainty; for we do not know that there is any difference in the nature of the blood which it is carried to these organs (except in the liver which is

is

is supplied with blood from the veins) neither do the particles of these various humours exist in the blood tho after it has been subjected to the action of these organs. And lastly we have not been able to discover any variety either in the shape of the particles or in the size of the orifices of the vessels. But if this was the case as the Iatromathematicians have said, and that the different humours were secreted by the different sizes of the orifices in the glands: we could never have any of them in a state of purity; because the thinner fluid (which had the smallest particles) would strain out of these organs with the thickest ones and be mixed together; so that perhaps we should have the urine and bile; the semen and mucus; the milk and the fat all secreted together and the one corrupting the other. Such of the humours as are of a mean thickness as the bile the urine and mucus are all very thin when newly secreted; each being of its pro-
per

proper consistency; and dont become thicker till afterwards. We also find that the bile it. self after it is inspissated can be reabsorbed in the blood; and will then pass out of the body with the urine the thinnest fluid of any.

DCXCVIII. And we must confess that the Chemists have not been successful, who have tried to account for these phenomena upon quite different principles. They supposed that the blood entered these glands in its natural state and that it underwent some chemical action while in them which produced a total change in its nature, similar to the conversion of grape juice into wine and that again into vinegar. And that they might be able to support this theory they supposed that there was a particular species of fermenting power in each gland which produced the change necessary for the formation of that fluid the gland was designed to secrete. But we have not as yet discovered any such property in the glands

humours; and if we had it would not be sufficient to explain all the phenomena attending secretion.

DCXCIX. It is perfectly obvious that all the humours must undergo some great and wonderful change in the secerning organs. But those who know the nature and powers of the different species of fermentation; and attend for a moment to the changes which these humours undergo; will soon see that this change cannot be the result of fermentation. Hence it is useless to waste words in confuting this opinion. I ought however always to remember that this change in whatever way it may be performed, depends much upon the salutary state of the secerning organs; for when these are affected; the quantity of the humours is not only varied; but its quality is also corrupted so that its nature appears to be totally changed. We also find that the seminal fluid is pro-

duced

produced by secretion, and that it is full of living animals, a circumstance which cannot be accounted for upon the principles of the mathematicians or of the chemists.

DCC. But although we are not able to explain the great and primary changes that take place in secretion; yet we know many useful facts concerning this function.

DCCI. There are many of the humours which are either thrown out of the body as soon as they are secreted; or are applied to their proper uses. Others of them are conveyed from the glands which secreted them by the excretory ducts, and lodge in their proper receptacles where they sometimes continue for a long time and undergo a further change. A great portion of many of the fluids is taken up by the absorbent vessels, and the residuum is left to become thick and viscid for its proper use. Besides these we find there are many of the secreted humours which when collected in a certain quantity; are then either

three or

throughout the body, or applied to their proper use within it. Of this we have examples in the bladder of urine; in the gall, semen and in the ovaries of the follicles all over the body.

DCCII. When the motion of the blood is accelerated, all the secretions are augmented: and this is particularly the case with the exhalation through the skin and the sweat, provided there be no contraction or obstruction in the small vessels of it; as happens upon the application of cold. This increase may continue in cases of increased exercise, heat, food and after the use of some stimulants.

DCCIII. Every secretion is augmented when the action of its organ is increased if that is not to too great a degree. In this way many of the secretions are increased by the application of some stimulus to their organs: which stimulus may either be diffused in the mass of the blood; or it may be applied to one part and not

and not to another. We have examples of this in cases of acrid substances applied to the eye; so when any saline matter is taken into the mouth; likewise in cases of mercury and many other diuretics which may be combined with the blood.

DCCIV. Besides there are some stimuli which affect the general and which will not only affect the body but can be mixed by the laws of sympathy, &c. and which will sometimes increase one secretion and diminish another. Thus the tears flow copiously during grief and the bile is plentifully discharged during anger; but in both cases the fauces become parched. The saliva flows copiously upon the sight or thought of agreeable food when the patient is hungary; and the seminal fluid is discharged in the males of many animals upon seeing or smelling a female during the rutting season. In man this is very conspicuous for it will happen from the pres

the price of imagination also; which thinking of a carnal pleasure reflecting upon sensual pleasures.

DCCV. Aspasm, contraction or any morbid action in the organs of secretion will in some cases impede this function; and in others increase or vitiate it. And when a spasm happens upon a remote part (so as to alter the course of the blood (381. 471.) it often increases the secretions. Of this we have an example in the variation in the flow of the milk during time; from hysterical affections or from terror anger or cold.

DCCVI. Some secretions are augmented or perhaps generated by the application of many slight chemical or mechanical stimuli applied to the excretory ducts. Thus the action of masticating and the taste of the food especially if it be acrid promotes the flow of the saliva; stomachics ... medicines will excite the discharge of the gall; and the infant not only draws the milk by the action of sucking; but also promotes

promote the secretion of it in the same manner, so that we find it will produce milk where there was none before.

DCCVII. Most of the secretions require to be always going on for the sake of life and health. But such as are subservient to the uses of generation and those that serve to nourish the young animal, commence and cease at certain periods being produced by particular stimuli. Thus the male semen and the genital humour in females (if they have any) seldom begin to flow before the age of puberty; and the one always disappears in old women; and we seldom meet with the other after a certain age in men. The milk is seldom secreted at any time except after parturition; and is then thought to proceed from the sympathy that exists between the womb and breasts.

DCCVIII. There is an astonishing equilibrium observable

observable among all the secretions; so that
when one is unusually encreased another
is diminished in the same proportion; to
prevent the body being too rapidly exhaust-
ed. This is particularly obvious in the ex-
halations from the skin; the sweat urine
and in the alvine discharge; and the same
thing is visible in the rest of them.

DCCIX. All the secretions are more copious in
some men than in others; and some people
have them bland and mild while in others
they are acrid. But in general the more sparing
they are the more acrid is their quality.
In infants all the humours are mild compared
with what they are in grown up people. And
we find them generally more bland in women
than in men. These varieties are commonly
observable in the saliva, sweat, urine, gall
and in the seminal fluid. Thus, there are
some people who have their mouth always
moist and seldom feel thirsty. And there
are

are some who perspire a great deal while in others the skin is always dry. There are also some men who secrete much, and a great quantity of acrid bile. And in some the urine is limpid and mild while in others it is high-coloured and acrid. In some the semen is much changed from in others.

DCCX. Although these circumstances depend a great deal upon the original structure of the body and the time of life, they may be much influenced by the way of living and the kind of food the patient uses.

DCCXI. In short all the humours are liable to be affected by the state of the blood from which they are secreted. Some of them as the milk urine, exhalations from the skin and sweat are secreted most copiously after eating and drinking. And in a nurse the milk which is the most abundant fluid is secreted very sparingly after she has fasted for any length of time; and it is thrown off in a quantity

that

that the infant vomits it up as disagreeing with it. But soon after the future fluid is secreted in great abundance and of a perfectly good quality. Immediately after drinking the humour (urine) is secreted but slowly; but in a little after it flows so freely that the drink passes off before we think it has reached the kidneys. This perhaps proceeds from some stimulus communicated to the kidneys by sympathy with the stomach as per a spasm affecting the remote vessels & thereby directing more blood to the kidneys so as to excite their action. No person can perspire copiously for any length of time unless he be naturally of a moist constitution or have a plentiful quantity of thin fluid in his veins; or lastly, unless he drinks copiously so as to dilute the humours while he is perspiring. But when we wish to excite a copious flow of the urine as usual we must not only drink plentifully; but we must

must also attend to the temperature of the body as it must not be kept too hot nor too cold.

DCCXII. Lastly during sleep perhaps all the secretions are deminished because at that time the motion of the blood is slower and the secreting organs like the rest of the body less sensible and therefore less readily excited to their duty. The perspiration therefore appears to be increased during sleep (1) by the greater warmth of the clothing which causes it; for we find that we dont keep warm so much if we go to sleep in the clothes we usually wear when awake.

DCCXIII Some of the secretions are very sparce and others very copious; but we cannot readily measure the quantity of any of them to any measure; because they are so different in different health in sickness and in health for the reasons already mentioned (709. 712.) There have however been instances of incredible quantities of saliva, gastric juice and of bile ejected

bile secreted in a very short space of time.

DCCXIV. Neither are we able to judge accurately of the quantity of the ejections as the urine sweat and exhalations through the skin and lungs: although there have been a number of experiments made with a view to ascertain this point; because physicians have thought it would be of the utmost importance both in preserving health and in curing diseases.

DCCXV. The urine can easily be weighed but its quantity is very apt to vary with the constitution, age, way of life and species of food and drink we use; but nothing is so apt to alter its quantity as the exhalations through the skin; for when these are increased the quantity of urine is proportionally diminished. Whether that increase happen from muscular idleness or from heat or cold applied to the body. For we observe a great equilibrium between these two ejections. Sometimes we find there is not above one pound of urine passed

passed for a healthy man in a day; and at other times it will exceed four pints; and in a diseased state it sometimes exceeds twelve pounds: hence we conclude that the medium three pounds six ounces and one half is what a healthy man ought to void in a day.

DCCXVI. The exhalations through the skin and the urine are also liable to great variations and the precise quantities cannot easily ascertained because they in general pass off the quantity of drink used in the time. There are many experiments that show that the body is always absorbing something from the air; a fact which has long since been confirmed by the observations of Sanctorius. And we find that those absorptions are in some instances much greater in quantity than the exhalations, as is very obvious if a person be exhausted by long fasting; or in cases where there is a great loss of urine; or when a person relapses in a dropsy after being tapped.

DCCXVII.

DCCXVII. Every secretion which it is more sparing or more plentiful than is natural for it to be, becomes hurtful (36.) because it either impedes or corrupts the function to which it is subservient. Thus the smell, taste, and digestion are often vitiated by the humours of the mouth, nose and stomach, intestines or liver being either too sparing or too copiously secreted. The excretion of every humour will be hurtful if it be not performed as it ought to be; in this way an encreased discharge of the saliva which may be produced by many acrid medicines will exhaust the body and affect the digestion by its being spit out when it ought to descend into the stomach and promote this function.

DCCXVIII. If the humours which ought to be excreted are suppressed or retained or if they be discharged in too great quantities, it will soon produce a serious alteration in the health

health of the patient as is most conspicuous in cases of any alteration in the urine and exhalations from the skin. (756.)

DCCXIX. The exhalations from the skin are chiefly increased by any acceleration in the motion of the blood (1623.) even when it will have but little effect upon the other secretions (762.) and this depends partly upon the looseness of the texture of the skin itself and the relaxed state of its capillaries; as from heat in the warm bath; or from a flaccid state of the constitution; or it may depend upon the blood being much diluted with thin watery fluids, which it [illegible] readily parts with and exhales in this way. 52. 322. Hence the reason why some parts of the body perspire while others are quite dry; and hence the cause of cold sweats which are often observed and which proceed from a defect in the powers which move the blood; and are therefore a very unfavourable omen.

DCCXX. An excess in the cutaneous exhalations

fluids

proves hurtful chiefly by it's exhausting the body; and debilitating and relaxing the skin so that it renders the person liable to all the ills that result from the application of cold by his being made unusually weak and sensitive. A very powerful perspiration will sometimes relax and exhaust the body so as to induce syncope or death itself. But we never meet with examples of the blood being so inspissated and corrupted by this means that the person is rendered more liable to inflammation and fevers &c.

DCCXXI. Passions sometimes natural to some people; but we see so few persons being marked with features that they cannot be suppressed with out the greatest danger. A plentiful sweat will sometimes break the force of a disease particularly a fever, but it is more frequently a part of the disease and proves hurtful by exhausting the strength of the patient. — We are only able to learn from experience this

what

what particular advantage sweating will be be
neficial or serious. But the absence that when
the sweat is general prevented & fatal; there
by and is of action upon nature; and when
it moderates the heat of the body; softens the
pulse and makes it slower; and when it is
accompanied with a moisture in the tongue
and mouth; relieves the anxiety and general
sickness and renews the appetite; it is generally
beneficial. But the contrary of sweat that is not
attended with any good effects, is such, when
suppressed in its nature, small when
only of some or one part of the body as the face
neck and breast, while the rest and hairs
body the joints are hot and dry: it augments
the patient's misery, and unless such
depletion be necessary must forbid caution
Lastly medical nurse and knight by nature
that in many diseases perspiration
ought to be excited by artificial means
as it is often of the greatest service to the pa
tient

natural.

DCCXXII. We often meet with instances of a deficient and suppressed action of the accustomed excretions. The excretions are apt to become deficient from idle and sedentary habit of life; oppressive affections of the mind (342. 343.) which lessen the motion of the blood and increase general debility: or from exposure to moist atmospheres where the person is but thinly cloathed; from the use of hard dry food; or when the orifices of the skin and its vessels are corrugated and closed up, as in old men, in whom the perspiration is always lessened and the urine proportionably more than it is in young people.

DCCXXIII. There are many ill effects from a defect of this nature. In the first place the whole body is apt to become too full (unless some other secretion be increased to make up for this retention) and it turns fat and lumpish; the mind also grows dull and become

sad

lad; for a cheerful mind promotes the secretions and when these are stopped the mind becomes dull in its turn. The digestion is vitiated and the appetite fails from the sympathy which exists between the stomach and skin (354). At least the matter which is detained becomes putrid and noxious and by degrees corrupts the whole mass of the fluids.

DCCXXV. But a sudden suppressed sweat is attended with still more eminent danger, not only from the retention of the matter which ought to be expelled; but also from the sudden repulsion of the humours from the surface of the body which generally fall upon some other part; or likewise from the powerful spasm or contraction which is formed upon the minute vessels. Hence proceed fever and inflammations, unnatural congestions of blood; haemorrhagies and increased and vitiated flow of the other

of the secretions; as that of the urine and alvine discharge.

DCCXXV. Eruptions, exhalations and excretions often suppressed by the sudden application of cold to the body when it is hot; or by many passions of the mind; and the same will happen from coldness of the spasmodic kind as in hysterical affections. These are also liable to be stopped by the application of powerful contracting forces to the minute vessels of the skin; similar to what happens in intermittent and continued fevers; the action of which is not yet perfectly understood.

DCCXXVI. The urine is also liable to become deficient in quantity; or too copious; and it is sometimes entirely suppressed: or bilious kind in some cases it is voided with great pain; and much vitiated in its quality. There has been a great deal written applicable to this part of the subject, concerning the disorders

diseases which proceed from a superabundant quantity of this fluid in the blood; or from it's containing an unnatural quantity of salts and hence becoming too acrid: much also has been said regarding the repulsion of the humours from the surface towards the internal parts of the body. That an increased flow of urine most frequently proceeds from some acrimony in the blood stimulating the kidneys: as from squills, cochlicoria &c. And this is also often induced by spasm affecting the secreting vessels of the kidneys; or from any thing irritating them in a peculiar manner, or more acutely with some other more acute part; perhaps with the intestines or surface of the body as in hysterical affections where an increased flow of urine is a very common symptom. Lastly we often find the quantity of urine incredibly large, and it's quality vitiated by being impregnated with oily or saccharine matter, yet the cause of it is not understood; for we don't know if it proceeds from an

discovered

diseased state of the kidneys; or of a disease of that part; or if it be the effect of some disease of the whole system. This species of complaint is termed Diabetes: the nature and cause of which is not yet understood; but it probably proceeds from some affection of the kidneys or from a corrupted state of the whole mass of the blood; or perhaps from some depraved state of the organs of digestion and of the Lungs: because the fluid secreted in this disease is so different from that usually discharged from the blood; and because it has some resemblance to half digested aliment.

DCCXXVII. From all this the reason will be obvious how an increased flow of urine proves hurtful to man: by breaking his strength, abstracting his nourishment and exhausting his body. And it deserves to be noticed that many have sunk under this disease: a circumstance which is the less to be wondered at, when we reflect that the cause being

did

but little understood, our mode of cure must be doubtful; and in many cases ineffectual.

DCCXXVIII. An unusually great discharge of urine is in many cases a slight and trifling disease; and may common to people of a hysterical or nervous habit of body. We ought also to observe that there are many complaints as fevers and various sorts of dropsies which have been cured by a copious flow of urine. Hence the propriety of Physicians attending to the state of their patients urine particularly when they are feverish. And this was a point which many of the old physicians devoted a great deal of their attention to; because they supposed that they could account for all the different changes the urine exhibited; and they also imagined that these changes had a considerable weight in the prognosis of the disease. But in our days Physicians do not attend so particularly to this branch as

their

their perfection did: although it must be observed that the various appearances of the urine to a skilful practitioner are often of considerable service in directing his practice.

DCCXXIX. Lastly we know both from practice and reason that it is of service in many disorders to promote the discharge of the urine by artificial means; the reason of which will be mentioned in its proper place.

DCCXLX. A suppression of urine is attended with great inconvenience to the sick person; and will be productive of imminent danger unless soon relieved. This malady commonly called Ischuria has been divided and subdivided by some authors and indeed properly enough. But it is of little importance to us how many species of it have been enumerated; it is perfectly obvious that it must be a complicated disorder, because it may proceed from disorders of so many different parts

different parts; as from those of the kidneys ureters, bladder urethra or from diseases of the contiguous parts. Thus it may be induced by any irritation or obstruction of one or both kidneys or ureters; from calculi blood mucus or blood; or from inflammation suppuration, schirrous or spasm; or from any tumour in the neighbouring parts producing a compression; or happens in cases of over distention of any of the viscera whether from the faeces in the colon; or from stercoraceous matter, air or water; either of which will diminish the secretion of urine and obstruct its motion; these circumstances may also impede its passage to the bladder after it is secreted.

DCCXXXI. The obstructions with which the urine may be impeded after it has descended into the bladder are very numerous and frequently occur. They chiefly proceed from the various affections of that organ which

whether

whether these proceed from irritation, inflammation or spasm: and be the effect of calculi the admission of acrid substances: or occasioned by its sympathy with other parts. The same effect will also result from any defect in the structure of the bladder as from hernia laceration or from debility or paralysis of its fibres; which may either proceed from general paralysis: or from over distention (or paralysis of some neighbouring part 321.) An obstruction may also be produced by calosity of the urinary or an ulcerated state of the bladder or perhaps from a quantity of thick pus, blood or mucus or calculi closing up the neck of it. Lastly the same disorders may proceed from the various disorders to which the urethra is subject: as when it is obstructed compressed or obliterated which often occurs after an ill managed venereal attack especially from a virulent gonorrhœa.

DCCXXXII. Lastly the urine may be suppressed in the bladder in consequence of a general stupor (VII. 171) proceeding from some affection in the brain (292.) as in fevers in which the patient either does not perceive the stimulus it makes: or that stimulus is not sufficiently strong to throw the fibres of the bladder into a state of contraction. If this continues for a short time the bladder becomes paralytic from over distention and is never after able to contract properly. This is considered as a very bad omen in acute febrile disorders and is commonly followed by death.

DCCXXXIII. From whatever cause the urine be suppressed, if it continues long in that state it is productive of very great inconvenience to the patient. The distention of the bladder produces oppression, uneasiness and pain; not only in itself but also in the adjoining parts and round the whole body. The muscles that shut

that its mouth are affected with atrecy & paralysis
and the fibres which act in emptying it are also
attacked with debility and then paralysis (321. 778.)
so that they cant propell the urine even when
the catheter is introduced, for the purpose of
emptying it. If the obstruction be not removed
this is succeeded by inflammation, gangrene
and laceration; hence irritation of the whole
body; then nausea and vomiting, vertigo, ge-
neral stupor: and at last the urine becomes
diffused through the blood (320. 21. 534.) which
being poured out into the various cavities of
the body and head induces torpidity tremors
convulsions and death.

DCCXXXIV. If in from the same causes through a
a less violent degree that a painful disease
of urine is produced; primary that retention
body which is termed Dysuria. This arises
from any unusual irritation, inflammation, ul-
ceration callosity or calculi affecting the bladder
likewise from nucous or any erosion of it from the

from the use of acrid medicines or from disorders of the adjacent parts. The urine is also liable to change its colour, and become red or black bloody or purulent, and it may also be mixed with mucus or acid: but the cause of all these is perfectly obvious.

DCCXXXV. The most common defect in the urinary system is where there is a constant and indescribable uneasiness, accompanied with a frequent desire to make urine; but where nothing is passed but a few drops and these usually accompanied with pain. This forms the disease termed strangury. It is often induced in a healthy person by the admission of some acrid substances into the urinary passages: and it is a very common occurrence in old men who are subject to diseases of the kidneys or bladder. It frequently proceeds from an acrid irritating discharge or from inflammation or an ulcerated state of it caused by its

leaving

being deprived of its proper mucous or vitiated the same offices. Or lastly a strangury may be brought on by a diseased state of the neighbouring parts as pain sympathy with the uterus, vagina, urethra, prostate gland or with the rectum or kidneys whether proceeding from inflammation of these parts, tumours, calculi, prolapsus or from pregnancy.

DCCXXXVI. Another very common affection of this function which is closely allied to the former happens when the urine cannot be retained for the proper time nor voided as it ought to be; but where it is discharged unknown to the patient and without the action of its organs and cannot be stopped at will as in a healthy state. In some cases of this malady it flows off drop by drop without the patient's being aware of it; and this is what is strictly called an incontinence of urine; but in others it is retained for some time and then passes off very freely without the patient's being sensible of it.

And

and perhaps contrary to his will.

DCCXXXVII. Incontinence of urine may be brought on by debility, paralysis ulcerous wound; and it may also proceed from severe irritation if long continued and particularly if applied to the neck of the bladder, as from calculi, general paralysis, or any violent force applied to the neck of the bladder or neighbouring parts as in cases of difficult parturition. A disease similar to this is found accompanying many others particularly fevers & hydrocephalus in which the torpidity is so great that the patient does not perceive the propensity to void the urine, although the usual stimulus be applied to the bladder; in these cases it is voided during respiration from the consent that exists between the muscles of respiration and those of the urinary system. For from this same cause that many normal dogs cannot retain their urine during sleep even when they are in perfect health; because at their

at their time of life the secretions are all very copious and they sleep very deep: hence the muscles are more irritable and of course the bladder less patient of any stimulus than it is in the adults. The urine sometimes cannot be retained owing to some tumor upon the neighbouring parts pressing upon the bladder as often happens during pregnancy. In some cases the urine is thrown out with a great force owing to a general spasm: or from some violent contraction in the muscles of respiration which compresses the whole abdomen as in cases of sneezing, coughing, laughing or during child-birth.

DCCXXXVIII. Lastly among the defects of the urinary system we ought to mention the formation of calculi which give rise to so many serious maladies (37.) Besides the water and saline substances which the urine contains it is also impregnated with a considerable portion of earthy and glutinous particles which are approaching towards putrescency before

before they are combined with it; and are very prone to pass into the last stage of corruption.

DCCXXXIX. Hence it happens that the urine of a very healthy person will deposite a copious sediment when it cools; which soon incrusts the vessel in which it stands. There is no deposition of this sort takes place in a healthy man while it is within the body; but if there should be the least particle of solid matter in the bladder it is quickly incrusted and encreases to a great size. And this perhaps is considerably accelerated by that defect in the humours which renders them liable to form calculi; the cause of which is as yet but little understood. It has however been observed that this disorder is not only frequently congenital but that it is also hereditary; and we further find that those men who are liable to this distemper are also much afflicted with acrimony in the humours; and obtain considerable relief from such remedies as correct acidity and

and

and prevent its formation. Besides it was an old opinion and is still maintained by some that certain sorts of food and particularly acid drinks such as cyder do have a tendency to generate calculi; and that other species of food & drinks will preserve men from this disease. But although these opinions cannot be implicitely relied upon; yet it is perfectly well known that the urine of some men contains more acid and concrete matter than that of others; and that in some it is much readier to deposite its contents; and more apt to be converted into calculous matter than in others.

DCXL. Besides the nucleus which is the beginning of calculi is much more apt to be formed in the urinary passages of some men than in others and that from various causes. Thus the mucus of the kidneys themselves or any secretion arising from a disordered state of these organs; as from inflammation; or any inspissated secretion or blood glutten or pus having

having escaped from the vessels by their being relaxed or inflamed; and becoming a hard concrete mass; or even the smallest concretions in the kidneys themselves will answer for a nucleus to a calculi.

DCCXLI. Concretions of this sort although very small at first increase in size daily from the reasons already mentioned (739) they also sometimes descend from the kidneys without any pain and dont remain in the bladder but pass off with the urine. But it more frequently happens that they dont pass out of the kidneys tho they have attained such a size that they cannot pass through the ureters without exciting great pain. And hence in some instances they continue for a long time in the kidneys and the patient is not sensible of their existence tho they begin to pass through the ureter when the irritation and obstruction they produce affects both kidneys and destroys the whole body | from this proceeds the numerous severe

nephritis

maladies incident to their state; as pain of the loins kidneys and adjoining parts; nausea and vomiting; depraved digestion; spasms of the ureters inducing a suppression of urine, great irritation; inflammation and sometimes suppuration of the kidneys: producing strangury dysuria, and ischuria; the urine at one time limpid, and at another mixed with mucus, purulent bloody or black and accompanied with fever. In some cases there is a wasting of the kidneys and in others a corrupted state of them; at other times an obstruction, swelling or hardness or so great a destruction of the kidneys that in some instances the one has been found almost entirely consumed. During the descent of the calculus through the ureters and particularly when it sticks in it; the pain sometimes descends down to the testicles or leg of that side; but more frequently the leg is affected with the pain and the patient feels as if the testicle were retracted. These troubling symptoms proceed

then

739. It is the opinion of many ingenious Physicians of the present day that the first stage in the formation of calculi is the generation of acidity in the primæ viæ particularly that species of acid termed the lithic acid. And in this opinion they are confirmed from these calculi containing a great quantity of this acid as we find from analyzation. It is from this opinion that absorbent earths and alkaline remedies are so frequently used in these complaints. And hence the supposition in our context that they are induced from a too copious use of acids.

Query. Are there not some points of resemblance between persons affected with calculi & those subject to Gout: as may not the remote causes of both disorders be similar? we find them both hereditary; and both apt to occur in people of a sedentary life particularly in those who live freely.

from the compression of the Spermatic chord which lies immediately under the ureter; or from the irritation or compression of some branches of the nerve which passes from the psoas muscles to the testicle and leg: or from distention of the ureter urinarius; or sympathy (250) between it and the psoas muscle which may be affected with swelling or inflammation. But all these things however trifling ought to be attended to by the Physician as they serve to show the nature of the disease when it is otherwise doubtful.

DCCXLII. The cause of these numerous ills being therefore perfectly obvious, and the reason of the slow descent of the calculi being evidently owing to the pressure of the ureter distended or relaxed state of the urinary passages: The plan of cure should be entirely directed towards mitigating the worst symptoms and accelerating the descent of the calculus

calculus; hence we ought to use all those remedies which remove inflammation and fever; such as diminish the sensibility, hence the irritation, and relax the contractions of the urinary passages, and such as relax the whole body: likewise such as emolly the intestines allay the vomiting and wash out those passages through which the urine goes. also all those remedies which dilute the urine itself, and allay the irritation & pain of its organs; and these ought also to be rendered with gummy and glutinous substances in place of their natural mucus which is rubbed by the violence of the disease.

DCCXLIII. By using these means we may avoid immediate danger; but they will be of little service if the calculus have lodged in the bladder. For in this situation it will soon attain such a size that it cannot lie

be passed off with the urine; and will soon occasion great pain and irritation particularly towards the neck of the urethra thereby inducing strangury, dysuria, ischuria, micturition of urine, inflammation suppuration and ulcer, or gangrene and callous state of the bladder. and if the patient does not sink under these ills) his strength is at last broken by the constant pain and irritation; a slow hectic fever soon comes on accompanied with a general wasting which terminates in death.

DCCXLIV. Lastly we must not omit to mention those other secreting organs which are more strictly termed glands: because these are more liable to obstruction and the most serious maladies resulting from it than any other part of the body.

DCCXLV. In these we often meet with indurated tumours which are not attended with pain nor more frequently with a diminished sensibility of the part forming what is called a

schirrus

chirous. This sometimes continues for a long time without any pain or uneasiness; but at least it becomes very painful, and proves readily into a very unwholesome state of suppuration which ends in a malignant ulcer that not only consumes the adjoining parts but also corrupts the whole body with an incurable poison. This constitutes what is called a Cancer which in some cases proves soon fatal by eroding some of the large blood vessels; but more frequently gives rise to a miserable wasting and hectic state whose termination is no less certain and fatal.

DCCXLVI. The cause of this horrible disease is not yet known. But it appears to originate in some degree in the structure of the glands by which the circulation in these parts is rendered more languid, and hence they are more prone to obstructions and imperfect and malignant ulcerations. These are also

vide constitution whether congenital or hereditary which appear different liable to this sort of malady: and this second due to various causes of a weak, languid or stupid nature. especially especially this second due to such subject to this second malady than among others. and it is much more common in old people than in young, and in those who have been debilitated either by idleness or by too hard labour. this is in such persons as have been upon a poor and indigestible food: or in those who have been afflicted with depressing passions of the mind. in short those in whom the morning powers of the blood are much broken, are particularly liable to be affected with cancers.

DCCXLVII. chronic external inflammation without known cause. sanctions it is called such inflammation not properly disposed, but more frequently owes its origin to some ex-

-ternal

external violence affecting the gland: and the reason of this is very obvious for what ever destroys the structure of the gland will produce an obstruction in it. From all this we need not be surprised that this is a disorder difficult to cure in its incipient state: and that when it is allowed to go on it becomes totally incurable.

Lecture 5 Calculus Urinæ

Definition of Pain. Chap. V.
of anxiety id.
of Fainting id.
of Death IX.
of Sensation & Motion XI.
Irritability & Mobility. XII.
Phlogistic Diathesis id.
Torpidity id.
of the Pulse XIII.
of the Circulation XIV.
the Bufty Coat id.
— Animal heat XVII.

MS
Acc. no. 239

MS
Acc. no. 239

15866663639